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## SPECIAL MACHINERY AND APPLIANCES ON BOARD SHIP

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Although the first marine electrical installation was installed on the steamer Columbia in 1880, and the first electrical installation on a United States naval vessel followed three years later on the United States steamer Trenton, no comparison can be made of the former vessel with its installation of 115 lamps and the latter vessel with 150 lamps, with the great merchant vessel of today with 3,000 lamps, or the modern naval vessel with 1,500 lamps installed. The foregoing is mentioned from the fact of the important bearing that electrical installations on board ship have had on the development of special machinery. The importance of lighting a vessel has developed to the highest degree, high speed engines for driving the generating sets, in which are embodied the greatest amount of power per pound of material, per square foot of floor space. Once given a satisfactory generating set, it was a simple step to the adoption of the electrical current for power purposes.

The earlier installations were all belt driven but the vital importance of space and weight soon developed the modern direct-connected set. The engine and dynamo are bolted to the same bed plate and the crank shaft rigidly connected to the armature by a coupling. They vary in size up to 100 K. W. (134 H. P.) and run at from 300 to 500 R. P. M. The engines of the vertical type may be single, double, tandem compound, or cross compound, and are designed to operate on from 80 to 120 lbs. steam pressure. The high-speed, short-stroke, double-cylinder engines of a few years since have given way to the single-cylinder, double-acting, moderate speed engine.

The single engine recommends itself for simplicity, the tandem compound for its short longitudinal length, and the cross compound when head-room is not available. Both valves are generally of the piston types, but some makers still prefer the slide valve for the low-pressure cylinder. Constant speed is maintained by flywheel governors of the inertia type. Lubrication may be by gravity, but forced lubrication is in general use, and is accomplished by a small pump operated from the crank shaft. Lubrication of the steam spaces is not desirable, and the modern engine works successfully without oil in the steam spaces. Generators for shipboard are similar to those in use on shore, and are wound for 110 volts for merchant service, the United States navy having lately adopted 125 volts as its standard. The ma-

chines are compound wound and are designed to compensate for their internal losses so that they operate at constant potential under all conditions. In two naval vessels having 80 volt generators (before the present voltage of 125 was adopted), the power is supplied to motors at 160 volts, and recently on two merchant ships having 110 volt generators the power is supplied to motors at 220 volts,—the latter probably being the highest voltage in use on shipboard.

### ELECTRICALLY DRIVEN AUXILIARIES—STEERING GEAR.

It is a peculiar fact that the first application of the electric current for power purposes was applied to the operation of the valve of the steering engine, yet no practical electrical steering gear was perfected until recent years and while more attention has been paid to this application abroad, only a comparatively few of the American-built ships have been equipped. From an extended experience with electrical steering gear as installed in this country, the writer favors its use, and predicts its more universal adoption, when its better qualities become known.

### VENTILATION FANS.

It was a short step from the use of a small fan supplied from the lighting circuit to the adoption of electrically-driven fans for ventilation. The adoption of the motor-driven fan avoided the introduction of steam pipes into living spaces (simplifying ventilation) and the noises consequent to fans driven by a reciprocating engine. By the subdivision of the ventilation system a greater saving in power was effected. From an installation of six or seven very large fans, only a year or two since, to upward of thirty-five fans installed in practically the same size of vessel, and to perform identical work, is a wide departure, but resulted in a saving of nearly one-third the power required, due principally to the elimination of friction losses consequent on large volumes of air being transmitted over long distances. Further,—this avoided piercing the watertight bulkheads and compartments, and in the event of accident to one's system, does not make possible the inconvenience of uninhabitability of a large portion of a vessel, as was possible with a few fans supplying a large portion of the ship.

The application of the electric motor to forced draft blower, while identical in application to that of a ventilating fan, has not been so universally adopted, the main reasons being

that the engine room force being charged with the operation of the forced draft blowers, and the deck force being in charge of ventilating blowers, it is evident that the engine room force would prefer a steam-driven auxiliary with which they are more familiar. Several vessels have been fitted with motor-driven forced draft blowers, and under very adverse conditions of installation, these auxiliaries have been very satisfactory, requiring practically no attention.

#### ELEVATORS AND WINCHES.

For handling meats and provisions from the hold and storerooms to the 'tween deck spaces, freight elevators have been installed on merchant vessels, generally in the hatch ways, or adjacent thereto, and in other cases whip hoists are used, or a lead of rope is taken to the nearest winch.

Although the electric-driven winch is now being installed on all modern naval vessels there has been but few installations on merchant ships. Winches are generally located almost at the extreme ends of the vessel, making it necessary to carry long leads of steam piping the whole length and breadth of the vessel, occupying and unduly heating all the spaces traversed by the pipes. In cold weather the winches have to be kept running to avoid freezing, for if the steam were entirely shut off these long leads of pipe, it is apparent that when the steam again enters the pipes, the majority of the joints will leak, and time is lost in efforts to clear the pipes of the entrained water.

The electric-driven winch avoids the above trouble, since all the steam is used in the generator engine, no heating or leakage of the conductors results, and it is ready for use at all times.

#### LITTLE CHANGE IN PUMPS.

Little change has been made in pumps, but the modern naval vessels are now being equipped with electric-driven, fresh water pumps. They consist of a triplex, single-acting pump driven through gearing by a constant speed motor, and have been installed so to be automatically controlled by the height of the water. Electrically driven bilge pumps have been installed on foreign naval vessels but have not found favor in this country. The foreign installations consist of a motor located on a deck above the water line and direct connected to a vertical shaft which drives the usual type of centrifugal pump, located under the inner bottom of the vessel, the motor armature and pump rotating in a horizontal plane. The advantage claimed is, that, in case of accident, and the necessity of the men abandoning the machinery spaces that the pumping power (the motor) is removed from danger. Those installations coming under the writer's observation have been very successful.

#### WINDLASS AND CAPSTAN.

If we except the increase in size there has not been any material changes made in windlasses in recent years. Only two electric-driven installations are known to the writer, and are of such a small size as not to be worthy of consideration. The application of the motor drive to the windlass has often been contemplated but generally rejected, due to apprehension, more than to any disadvantage being attributed it. For this there seems to be no foundation, for with the proper type of motor, its regulation would be equal and probably superior to the steam drive. The same saving can be effected in this case as in that of the winches, and plans are now being prepared of an electric driven windlass that embodies the principal characteristics of a steam-driven equipment.

Similarly in the case of capstans, very few installations have been made other than those of the usual steam-driven types. In this case too the proper type electric motor would have the same characteristic as the steam drive, i. e., fast speeds on light loads, and slow speeds on heavy load, with

none of the disadvantages as outlined above as regards long leads of steam pipes, etc.

#### FOUNDRY AND MACHINE SHOP.

Driving the laundry machinery or machine tools on board ship is identical with that operation ashore. The motor was first installed in the laundry on account of its heated location and heat arising from the machinery, in an effort to avoid the engine and steam piping and its additional heat. The laundries are now equipped with electrically heated ironers, driven by the motor, and hand irons electrically heated to a constant temperature.

For the machine shop, the motor was first installed on account of the shop being located abaft of, and below the level of the engine-room floor, making it difficult to properly discharge the exhaust from the engine, or that the shop was in an isolated portion of the ship near quarters where it was objectionable to have steam-piping. The motors are generally installed for constant speed, but controlling panels can be installed that will give a wide range of motor speeds.

#### DOORS AND HATCHES.

The early types of power operated watertight doors were electric-driven, but were supplanted by the pneumatic operated door. The impossibility of keeping in repair a long line of piping under pressure together with the multitudinous valves, joints, springs, etc., incident to this type of door, soon caused a reversion to the electrically operated door, which is now being installed. The latter door is either vertical or horizontal, and of the sliding type, resembling a gate valve, and is operated through gearing by a motor, which functions automatically at the extremes of the doors' travel. In case of collision all the doors may be closed simultaneously from a central station, yet they may be operated at the door, so to admit of escape, in which case the door will again automatically close after exit, and remain closed while the central operating lever is in the collision position. The hatches are operated in the same manner, but instead of sliding are hinged, and operated by the motor through a system of gearing and levers.

#### SAMOVARS FOR HEATING AND COOKING.

Samovars for heating and cooking have been in use for several years, and electrically heated curling irons are a part of the modern passenger stateroom equipment. Only one instance of heating staterooms and quarters by the electric current has come under the writer's notice. They have been installed in the largest American-built steamship, are very compact, and have eight regulating sections so that an equable temperature can be maintained to suit the convenience of the user.

#### SIGNALLING AND COMMUNICATION.

Electric telegraphs for order transmission are in more or less general use, and while similar in appearance to the mechanical telegraphs are operated by the lighting of a lamp behind a glass dial carrying the desired order. The running lights are now protected from extinguishing by automatic electrical devices that give an audible or visible signal, so that means can be taken to replace the light, or automatically, whereby a reserve lamp is switched on to replace the extinguished lamp.

Electric indicators show all positions of the helm angle, so that the helmsman is not dependent on the wheel position for the determination of the helm position. Revolution indicators, indicate each revolution of the main engines, and by a simple attachment record the revolution for a given period of time, in addition to recording the direction of rotation.

A combination telegraph is now in use that has the features of recording each order transmitted to the engine-room; the time elapsing before the signal is answered, and a contin-

uous record of all orders, direction and number of revolutions, all indicated on the bridge of the vessel. The appliance is generally made to combine all the above, but can be purchased to perform each operation separately.

Fire alarms have been installed for some time in merchant vessels and consist of a fusible alloy forming the push button in the stateroom or quarters, whereby the fusing of this alloy closes the circuit and sounds the signal continuously until the cause is removed. In naval vessels a mechanical thermostat is installed and a separate annunciator is used. It is obvious that the installation of this valuable adjunct in the cargo spaces on merchant vessels, would decrease numerous severe losses from fire.

Whistle operators are in use that are electrically operated, so that any number of stations may be installed, from which the whistle may be operated. An attachment to this particular device admits of the installation of a telegraph key, so that code signals may be sent. A clockwork attachment is also used, so that in case of fog by closing a small switch the whistle is automatically operated for the interval required by law.

Telephones have begun to supersede speaking tubes, and the installation of our great ships include a central station, connecting all parts of the vessel. The modern marine telephone has no parts likely to disorder and with a satisfactory source of energy is not likely to cause trouble.

Ships' logs (for measurement of distances traversed) of the electrical and mechanical type have been installed, and have found favor from their good results. The main feature is the ability to have the record of the log at any instant, on the bridge or other station.

#### FUTURE APPLICATIONS.

While there is a good field for the application of the motor drive to engine room auxiliaries, feed pump, circulating pump, etc., this has not received the attention due, probably for the reason advanced above in case of the forced draft blowers. It will be apparent to any marine engineer the saving to be effected in space, weight, and cost in an engine room with electrical auxiliaries if consideration is given to the main features involved in the change, in replacing of large steam pipes by small wires, and reciprocating engines by rotary motors, and in addition, the consequent increase in the efficiency of the generating plant. Probably the greatest advance and the most unique application of the motor to engine room purposes was recently made in the installation of a single motor for handling both of the main engines of a United States naval vessel.

The increased application of the electric motor will create a better impression on shipboard, of its simplicity, attention required, cleanliness, heating and flexibility of purpose. As the modern engineer and architect now demand that the vessels' equipment be up to date in every particular, this will lead to improvements and an increase in number of accessories installed so that familiarity with these various devices will cause elimination of previous troubles and tend to a more universal adoption.

The armored cruiser Colorado, built by Cramp's of Philadelphia, on her official trial trip this week covered 88 nautical miles in 3 hours, 57 minutes, 7 seconds, maintaining an hourly average speed of 22.26 knots throughout the run, thus exceeding the contract speed by more than a quarter of a knot. It is thought that tide correction may exceed her average slightly. The highest speed developed was 23.33 knots and this was maintained for 6.6 miles during the homeward run. The Colorado is, therefore, the fastest vessel in the armored cruiser class and her speed has been exceeded only by the Minneapolis and the Columbia. The Russian cruiser Variag, however, also built by Cramp's, reached a speed of 24.6 knots.

## SPECIAL MACHINERY ON BOARD A NAVAL SHIP

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In this article it is not intended to give a detailed description of the construction of all the mechanism mentioned, the aim being rather to give an idea of some of the conveniences and labor-saving apparatus used on the modern naval vessel. There are numerous appliances and devices with which those who are not directly employed in connection with naval work may be unfamiliar and an attempt is here made to explain and describe some of these fittings and their uses. While such a description is necessarily incomplete the more important of these installations will be treated.

Those who are responsible for the design of naval vessels are giving this subject very earnest and careful investigation and improvements are constantly being made. As naval ships are rapidly approaching a maximum of power and speed the greatest thought is being exercised towards attaining economy of operation and decrease of weight consistent with requisite strength. To accomplish this high grade material is being employed to a very great extent. This material is subjected to very rigid inspection, and it is due largely to its use that all the old cumbersome equipment is speedily giving way to the modern light weight innovations in which simplicity and reliability are a prime factor in the design. The latest plans for these vessels show workshops completely equipped with facilities for ordinary repair and overhaul.

In the machine shops are installed screw-cutting, back-geared, extension-gap lathe, capable of a swing of 28 in. over the upper and 48 in. over the lower ways, with 10 ft. between the centers when extended, fitted with hollow spindle, compound rest, steady and follow rests, power cross-feed, taper attachment, face plates, chucks, lathe tools and lathe dogs; screw-cutting, back-geared tool-room lathe, with a swing of 14 in. over the ways and 4 ft. between centers, fitted with quick-change feed, power cross-feed, hollow spindle, taper attachment, oil pan, face plates, chucks, drawing-in attachment and lathe tools; column tool-room shapers with 15 in. stroke and 15 in. traverse, fitted with automatic stop, adjustable table, graduated swivel vise with jaws for taper work, 24-in. graduated index center and a set of shaper tools; upright drills, able to drill holes up to 1½ in. at least 14 in. from edge of work, with 14 in. traverse of spindle, fitted with automatic and hand feed, sliding head, counterbalanced spindle, circular table, revolvable by gear and adjustable vertically by gear, automatic stop, tapping attachment, and a drill chuck; 16 in. sensitive drills, with a counterbalanced spindle fitted for No. 1 Morse taper, sliding head table to have vertical adjustment movement, and will drill holes up to 5⁄8 in., with drill chuck and complete set of drills from 1-16 in. to 5⁄8 in. by 32nds.; universal milling machines with overhanging arm, with an 18 in. longitudinal feed of table, 13 in. vertical movement and 4½ in. traverse, fitted with automatic cross-feed, universal chuck, arbor, index, swivel vise, spiral cutting attachment, milling cutters, side millers, metal slit saws, angular cutters, end mills and collets; combined hand punch and shears with 6 in. shear blades, able to cut 3⁄4 in. round iron, shears 3⁄8 in. steel plate, and punch 3⁄8 in. holes in 3⁄8 in. mild steel plates 4 in. from edge; double emery grinders on column, with carborundum wheels 12 in. diameter by 2 in. face, fitted with attachments for surface grinding; 30 by 4 in. grindstones, in iron trough, on legs, with shield, pan, oil bucket, adjustable rest and pulley; machinist's swivel-bottom vises, with jaws 5 in. wide, opening 8 in. with pipe jaws and copper vise lips; machinists tools, etc.

The blacksmith shops are fitted with a down draft blacksmith forge 42 in. square by 25 in. high, complete with tru-

jere, blast gate, anvil and block, water tank, coal box, tongs, chisels, punches, hammers, sledges, swages, fullers, flatters and hardys. The carpenter shops are fully equipped with work benches, lockers, tool racks, tools, etc.

During the last few years electricity has come in to use for driving a number of the auxiliary machines. At present the ventilating fans, turret turning apparatus, boat cranes, deck winches, ammunition hoists and conveyors, fresh-water pumps, sanitary pumps, laundry machinery, workshop machinery and refrigerating machinery are electrically operated.

The electric plant proper comprises the generating sets for ship's lighting and for turret turning, electric fixtures, incandescent lamps, arc lamps, searchlights, truck lights, night signal apparatus, diving lanterns, signal lanterns, cargo reflectors, ship's running lights, bracket fans, deck fans, electric whistle operators, switchboards, main and auxiliary distribution boards, controlling panels, switches, circuit breakers, starting devices, and other apparatus necessary for its efficient operation and control.

The handling of ammunition is not accompanied with as much danger as might be supposed when it is known with what care the apparatus is designed. Conveyors are installed for the transfer of the ammunition along the passages to the hoists. They are electrically operated and have continuous motion. The ammunition hoists are designed to handle either shell or charge and are of constant speed. The rated supply of ammunition to the battery is as follows:

For each 12-in. gun, one complete round to each gun every fifty seconds.

For each 8-in. gun, one complete round to each gun every thirty seconds.

For each 7-in. gun,  $3\frac{1}{2}$  complete rounds per minute.

For each 3-in. gun, 15 rounds per minute.

For each 3-pounder gun, 30 rounds per minute.

For each 1-pounder rapid-fire gun, 30 rounds per minute.

For each 1-pounder automatic gun, 100 rounds per minute.

The above rate of delivery is accomplished by the combined power and hand supply.

In handling ammunition to bridges and fighting tops, whip hoists operated by electric motors are fitted, together with cranes and other necessary fittings. The heaviest box of ammunition can be hoisted at a speed of 200 ft. per minute.

The system of interior communication is such that the officers in charge are constantly in communication with all parts of the ship. The completeness of this system will be appreciated when it is noted that telephones and voice tubes are arranged so as to enable the captain, from his station, to communicate with the engine and dynamo rooms, steering stations, turrets, guns, torpedo rooms, torpedo-directing stations, lookout platforms, wireless telegraph rooms and central stations; the persons having charge of the turrets with their guns and ammunition supply; torpedo rooms with the torpedo-directing station; the dynamo rooms with each other, with the searchlights, turrets, engine rooms, distribution boards, principal motor locations, and quarter decks; the several points of ammunition distribution with each other; the flying bridges with the engine, wireless telegraph, and steering rooms, the quarter deck, the captain's quarters, the stand-ard compass and lookout platforms; the executive officer's office and stateroom with the berth and quarter decks; the engine and fire rooms with each other; the engine rooms with the chief engineer's stateroom, the workshop, evaporator, store and steering rooms, and quarter deck; the wireless telegraph room with the captain's quarters; and from each ash loading point to discharge point. Mechanical signal systems are installed connecting the fire-rooms with each other and with the engine rooms. Repeating telegraphs are fitted for the propelling engines, with dials at the working plat-

forms, and connected to transmitters located in conning towers and on the flying bridges whereby the number of engine revolutions desired can be readily transmitted. Repeating telegraphs are also fitted at all steering wheels and steering engines, and connected to transmitters in conning towers, and on flying bridges for transmitting the desired helm angle; the angle is indicated at all stations at the same instant. There are also fitted call bells, buzzers, gongs, annunciators, heeling indicators, and turret hoist indicators. Direct reading shaft indicators are fitted to each of the main engines with indicating dials in conning towers and on the flying bridges, these enable the engineers to operate the engines in unison, and display the direction of rotation to the navigating officers.

Complete fire systems are installed for extinguishing fires and flooding ammunition compartments. Automatic fire alarms are fitted in the coal bunkers, magazines, storerooms, and in other places where spontaneous combustion is likely to take place.

The wireless telegraphy equipment is composed of, as component parts, the mast, the operating room, the earth connections, the aerial wire, the transmitting instruments, the receiving instruments, and the installing instruments. A room about 6 ft. square is required for the installation and operation of the instruments. It is a well ventilated, lighted and dry room. It is on the uppermost covered deck, with leads in to it for the aerial wire through hard rubber or ebonite installation let into the upper deck. The operating table is about 6 by 3 ft. of well seasoned dry lumber, capable of supporting the weight of the instruments, about 500 lbs. The current for primary of coil comes to switch on table with resistance for controlling it, measuring instruments, etc. A maximum current of about 20 amperes at 80 to 110 volts is required, though the usual sending is done with a current of less than 10 amperes at the same pressure. The instruments are put on or about the table. All connections are well made, and connecting wires are as short and direct as possible. The induction coil is conveniently mounted on bulkhead above the table, and the Leyden jar case near it on the table. As one terminal of the induction coil and the Leyden jar case is at high potential in sending their insulation is necessarily good. The interruptor and primary condenser are conveniently placed under the table, the interrupter being hung on gimbals. The interrupter-motor rheostat is in convenient reach on table and the primary rheostat on bulkhead. The receiver stand, tuning coil, and Morse key are on the table. The instructions for the operation of the apparatus contains the following extract: "Any dot and dash code may be used for signaling. \* \* \* The 'American Morse' is not very suitable for a tape record owing to the spaces in letters.

The operator must avoid a short, jerky style of sending. Dots and dashes must be firm and of proper lengths, as must also the interval between parts of a letter and the spaces between letters and words. Twelve to fifteen words a minute is a good speed for the Morse writer and should not be exceeded in normal sending."

The auxiliary machinery as installed on naval ships are of considerable magnitude. Air compressors are installed for use in running pneumatic tools and for blowing soot off the boiler tubes. Ash hoists of sufficient power to hoist 300 lbs. from the fire-room floors to the upper deck in five seconds, with steam of 150 lbs. pressure. These hoists have engines with two cylinders, with cranks at right angles, and follow-up gear. The reversing gear is operated from the upper deck, with adjustable safety gear to prevent overwinding and to stop the engine when the ash bucket reaches the fire-room floor. Bell pulls are fitted in the fire-rooms and on deck, for signaling in hoisting and lowering. The ash hoist-



ing gear is so constructed that the buckets do not have to be lifted by hand.

The forced draft apparatus consists of blowers capable of supplying to the fires continuously, with ease, sufficient air to maintain the maximum rate of combustion, with an air pressure in the fire-rooms of 2 in. of water. The engines for the blowers are of sufficient power to run the blowers at full speed with steam of 100 lbs. pressure. The manufacturers of turbine machinery have been invited to submit plans for operating the forced draft blowers by steam-driven turbines, but as yet they have been unable to design a satisfactory machine for this service.

An evaporating and distilling apparatus is supplied of a capacity equal to one gallon of water per indicated horse power of propelling engines per 24 hours. This rating has been made necessary by the great amount of fresh water required for the water tube boilers, drinking water, bath water, cooking water, and water for sanitary purposes.

The refrigerating apparatus is capable of supplying the ship with ice and of keeping the cold storage rooms at the proper temperature. The cold storage rooms are partitioned off into separate spaces for the captain, ward room officers, junior officers, warrant officers and crew. By this method it is possible to enter any one of the spaces without reducing the temperature in any of the other spaces, each space being thoroughly insulated.

Separate auxiliary condensers are installed, for the exclusive use of the dynamo engines, with air and circulating pumps.

The steering arrangements consist of a right and left-hand screw with traversing nuts direct-connected by side rods to a crosshead on the rudder stock. The weight of the rudder is transmitted to this crosshead by means of a ring fitted in a groove near the head of the rudder stock. Between the crosshead and the casting on the sternpost a floating disc is fitted, and recessed in the stuffing box casting to hold oil, the weight of the rudder being taken by this floating ring. The casting bolted to the sternpost and taking the weight of the rudder through this floating ring is fitted with a stuffing box around the rudder stock capable of adjustment in the steering-engine room. A friction band is fitted to the rudder stock and is operated in the steering-engine room. The engines are of ample power to put the rudder from hard aport to hard astarboard in twenty seconds when the vessel is moving ahead at full speed, with steam pressure of 150 lbs. per square inch. Provision is made at five different points in the ship for hand or steam steering.

Ventilation is a matter of great importance as the general health of the crew is dependent upon it, and it is also used to prevent the ammunition compartments from becoming overheated. Artificial ventilation is provided for all quarters, living spaces, passages, storerooms, and magazines below the main deck; also for air spaces over boilers and engine rooms and around magazines; and for water closets and similar inclosures above the main deck. The systems are so subdivided as to render unnecessary the piercing of any of the principal watertight bulkheads of the vessel with the ducts, except where absolutely unavoidable. This adds greatly to the safety of the ship, and the use of shorter ducts, made possible by the numerous subdivisions, increases the efficiency of the system. The ducts are designed to pass the required number of cubic feet of air per minute through each terminal, or to equal the total cubic feet per minute of each compartment ventilated, with the fan running at a speed corresponding to one ounce pressure with restricted delivery. This allows the air to be renewed often enough to insure good ventilation.

The plumbing is another extensive installation. Fresh water is supplied to all bath rooms, lavatories, wash rooms, pantries, galleys, scuttle bulk (water coolers), bakeries, laun-

dries, refrigerating plants, etc. The showers and bath tubs are fitted for salt and fresh water and are arranged so that the water can be heated through a distributing cock, designed to stand a steam pressure of 100 lbs. per square inch, and capable of raising the temperature of the water from 45 to 110 degrees. The flushing and sanitary system is arranged for supplying water to all water closets and urinals, wash rooms, shower baths, laundry, pantries, galleys, etc.

For the subsistence and care of the crew there are provided galleys, pantries, bakeries, laundries, etc. The galleys are equipped with dressers, lockers, coal boxes, pan and kettle racks, ranges, steam jacketed kettles, vegetable steamers, coffee urns and steam cookers for cooking and warming food. The pantries are fitted with steam tables, drawers, lockers, dressers, plate racks, glass and cup racks, hooks, clips, etc. The bakeries are provided with baking ovens, dough troughs, and steam and bread boxes. The laundries are equipped with washers, extractors, mangles, electrically-heated ironers, tubs, soap tanks, drying racks and other accessories.

An electrically operated firing device is installed in the fire-rooms for regulating the intervals of firing the furnaces. It consists of a cylindrical case with a dial, perforated with openings equal in number to the number of furnaces in the fire-room; each opening is covered with an opaque glass having a number on it left clear, each number corresponding to a furnace. Behind the glazed openings there are electric lights which are switched on and off successively by an electric motor. These motors run continuously, and are so arranged that all lights on the same side of the ship having the same number are illuminated at the same instant, followed by lights of the same number on the other side, and so on until all the furnaces have been fired.

Naval ships have excellent and efficient facilities for caring for the sick and injured. There are sick bays, contagious wards, dispensaries, and operating rooms. These hospital spaces are equipped with all the necessary apparatus and instruments for this service.

#### INVESTIGATING STEAMBOAT INSPECTION SERVICE

The board of supervising inspectors of the steamboat inspection service is now in Washington considering the report of the commission appointed to inquire into the General Slocum disaster. It might be well if the points were compared between the report of this commission and that formulated by the board of supervising inspectors themselves a year ago last June and submitted to Secretary Cortelyou, then secretary of the department of commerce and labor. Meanwhile President Roosevelt has directed Secretary Victor H. Metcalf, the present secretary of the department of commerce and labor, to make a thorough investigation of the several districts of the steamboat inspection service. This, of course, is all very well because it does everyone good to be stirred up once in a while. The officers directed to make the inquiry are on the retired list. Each officer has had assigned to him a certain district of the steamboat inspection service as follows: Rear Admiral Louis Kemff, first district, San Francisco; Com'dr. Z. L. Tanner, third district, Norfolk, Va.; Rear Admiral John R. Bartlett, interior Mississippi district; Rear Admiral Wells L. Field, eighth district, Detroit, Mich.; Rear Admiral E. M. Simons, ninth district, Cleveland; Rear Admiral W. C. Wise, tenth district, New Orleans.

The Hill & Sloan Ship Building Co., Seattle, Wash., has nearly finished a fishing steamer for the San Juan Packet Co. of Seattle. The steamer is 130 ft. over all; 24 ft. 6 in. beam and 13 ft. 6 in. deep. A fore and aft compound engine will be installed in her by the Warrington Iron Works of Seattle. The new steamer which will cost approximately \$40,000 will be used on the Halibut banks, Alaska.

## LIVERPOOL SHIPPING LETTER

Liverpool, Oct. 24. It is safe now to assert that the North Atlantic war of rates which has been waged most energetically since May last is practically ended and that the old rates will be reverted to at no distant date. In fact the Hamburg-American Line has already given notice to its agents in Liverpool that the steerage fares from Hamburg, Boulogne, and Cherbourg to New York will be raised shortly on the Deutschland, Moltke and Blucher to \$37, and by the Patrician, Graf Von Waldersee, Pennsylvania, Pretoria, Batavia, Belgravia and Bulgaria to \$35. All the other lines in due course will put up their fares accordingly, and no more will be heard of the rate war for long enough. It has been both a costly and

fortifying more and more the position they have attained with the object of making their hold on the Hungarian traffic even stronger than at present. Particularly is this the case in regard to the question of agents. The Cunard company rightly recognizes the immense importance of having in their employ the very best of agents, for they know full well that, especially where continental emigrants are concerned, it is upon the agents that they have almost wholly to rely for the continuance and expansion of their business.

The Atlantic passenger trade having largely diminished owing to the summer season being at an end, the various shipping companies have arranged for reduced sailings for the winter months. The service of the White Star Line has



American Ship Builder to Politician: "Yes, sir, it was all good timber when you delivered it, but I can't say that I have been able to build many ships with it."

useless struggle. That the Germans have lost heavily has all along been recognized, but beyond those who have carefully studied the question there are few who know to what an extent those losses amount to in the aggregate, for, in addition to the sum which will represent the cutting of their own rates, the Germans have made themselves responsible for the loss sustained by other lines running from this country. This is corroborated by the fact, which also conclusively indicates that the war is now over, that certain lines have already been requested to prepare statements of the losses they have incurred by reducing their fares. It is therefore computed that the Germans have, as a result of the abortive struggle lost something like \$150,000 per week, which since May last must amount in the aggregate to considerably over \$2,000,000. The Cunard company which has come out of the struggle victorious is said to be pursuing a vigorous policy, and to be

been curtailed, and instead of two vessels leaving the Mersey each week, only one vessel will sail and that every Wednesday. No change occurs in the freight trade, and the arrivals and departures will be as usual. In regard to the Cunard Line the Tuesday sailings to New York have also been discontinued. Between now and the spring opportunity will be taken to give the steamers the usual annual overhaul. There will also be fewer sailings in the Canadian trade, but the most notable announcement in connection with this traffic is that the two new turbine steamers of the Allan Line will take up their position on the Liverpool station on Feb. 23 and March 2 respectively. On Nov. 3 the Tunisian is advertised to sail for Quebec and Montreal and this concludes the summer service. Seven days later the Allan steamer Ionian opens the winter route to Halifax and St. John, N. B. Instead of weekly the service of the American Line to and from Phil-

adelphia will be fortnightly. One of the Dominion liners leaves for Quebec and Montreal on Oct. 27 before the St. Lawrence becomes unnavigable and as yet no further dates of sailing have been published.

The question of those who still remain outside the Sailing Ship Union of International Owners continues to be discussed. A further suggestion has been made that an effectual and simple way of dealing with these owners or managers would be that the leading brokers in Liverpool, London, Glasgow and at the continental ports, who are to a large extent ship owners themselves, and members of the union should refuse to entertain for outward business any vessel remaining outside the union. After making deductions of vessels in special trades, it appears that of iron and steel vessels of 1,000 tons net register and upwards belonging to Great Britain, Germany and France, 78.758 per cent are entered in the union, so that only 21.242 per cent are still outside. Taken separately, the percentage of British vessels entered is 79.542 per cent, German, about 78 per cent, and French, 76.75 per cent. Surely there are some means by which the owners of practically 79 per cent of the shipping tonnage can prevent the owners of about 21 per cent from destroying or even damaging to any extent the most unique sailing ship owners combination that ever existed. Otherwise the rates must fall to their former unprofitable level.

Freights on the American side are still very bad, both at New York and elsewhere. Cotton rates are reported to be very poor in the Gulf, but they are said to be somewhat better on the South Atlantic side. Cotton cargoes now arriving will afford increased employment at the docks, but grain, it is said, is not moving and although inquiries have been made, no business has been done. Some weeks, it is believed, will elapse before cargoes of grain will come freely to Liverpool. Eastern freights are not quite so brisk as they were, but there is still a good demand for tonnage, owing to the scarcity of ships in the east. Many steamers have gone through the Suez canal in ballast for homeward cargoes. As there is a great deal of produce to move yet in the east, eastern rates will be kept up owing to the scarcity of outward employment.

An arrangement has been practically concluded between the Mersey Docks and Harbor Board and the railway companies running into Liverpool with the primary object of facilitating and cheapening the handling of shipping traffic in railway trucks to and from the Mersey Dock system and the railway goods station. This should do much to make the port of Liverpool much cheaper than what it now is, and in this connection I may add it was becoming well known as a dear one for shippers. According to the draft agreement just prepared but not yet signed, the dock board will undertake to provide all necessary siding accommodation at and rails to the shipping berths, and manage all railway matters on the dock estate, as well as freeing the railway companies of tolls over the dock rails on traffic worked under this arrangement. In one clause it is suggested that with regard to railway borne traffic, the steamship companies should, in their own interests, make an inclusive charge, so that any firm in any part of the country using the Mersey port will know at a glance when they receive their bills of lading what they have to pay, and so avoid continual irritation.

So far as can be ascertained, the orders for the two new ocean steamers which the Canadian Pacific Railway Co. propose to build have not been placed, but there is every reason for believing that this will be done at an early date. There is a probability that the craft will be built on the Tyne.

The new and powerful fire float recently acquired by the Manchester corporation for use on the Manchester ship canal has just been delivered. The Firefly, as the new vessel is named, was built by Messrs. Merryweather & Sons. Prior to coming to Manchester she under-

went a trial on the Thames, and whilst at Westminster pier she was able to pour great volumes of water on the wharves on the opposite side of the river. It is claimed that the vessel has the most powerful combination of appliances for fire extinction of any similar boat in the kingdom, and her cost is estimated at from \$40,000 to \$50,000. The pumps are of the Greenwich horizontal pattern adopted by the British admiralty, and have a drawing capacity of 2,000 tons.

Cotton shipments are now arriving at Manchester via the ship canal in increasing quantities. Already Manchester has received by way of the ship canal 30,903 bales, which compares very favorably with the importation at the corresponding period of the record season of 1902-3.

The September returns of the Manchester Ship Canal Co. are just issued. The approximate revenues from traffic last month was \$160,000, as against \$151,350 during September last year. The total increase for the nine months of the current year is \$73,520.

### THE NICHOLSON SHIP LOG

The actuating method and the results obtained from this log are radically different from any other type. The log is operated by floats in stand pipes which are placed inside the vessel; one stand pipe being used to maintain the load level line of the vessel, the other is to drive the registering apparatus when the ship is under way and is known as the speed pipe. Connecting the load level pipe with the water outside is a  $\frac{3}{4}$ -in. seacock placed near the keel; close to this seacock is another for the speed pipe,  $1\frac{1}{4}$  in. in diameter. This cock is provided with a stuffing box and is arranged for a  $\frac{3}{4}$ -in. brass tube to pass through; this tube is called the intake tube and protrudes about 6 in. from the skin of the ship.

It is so arranged that the intake tube can be drawn in and examined or cleaned at any time. The intake tube is closed at the bottom end and a hole bored in the side, making it answer the purpose of an elbow. This hole always points ahead so when the vessel moves forward the water is forced into the intake and thus into the speed pipe.

The registering mechanism is usually placed in the pilot house or on the bridge and is connected to the floats by a chain and sprocket drive. This registering mechanism consists of a dial that shows exactly the speed per hour of the boat with all variations, a counter reading to hundredths for the distance traveled, a chronograph attachment which registers the speed with the time, and a clock which operates part of the mechanism and keeps the time.

This is stated to be the only log manufactured that shows the speed of the moment on a dial and records such speed on a paper record, two operations that are invaluable to a master of a ship. By simply glancing at the speed dial he can tell the exact speed at any time and the paper record provides incontestable evidence in case of accident or controversy.

The entire operation of the log is automatic and the only attention required is the winding of the clock and the changing of the record once a day. It is in successful use in the navy and merchant marine, nearly all the better class of passenger boats of the great lakes being equipped with this log.

The anthracite coal business formerly conducted by the W. L. Scott Co., will be continued by the Susquehanna Coal Co. with offices in Erie, Pa. Mr. C. L. Thompson, who has represented the Scott Company as general sales agent for many years, will on Jan. 1, 1905, become the general western agent for the Susquehanna Coal Co.

The Chicago nautical school of which Mr. W. J. Wilson, late lieutenant of the United States navy, is principal opened its annual term last week with a roll of twenty-six pupils, mostly yachtsmen and members of the Illinois naval reserve.



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The use of electricity aboard ship, as in its constantly extending applications on shore, is attended with so many advantages in the way of convenience, cleanliness, efficiency and ease of operation that the only logical outcome of the movement in its favor seems to be the adoption of the electric drive for all auxiliary machinery, as well as for all forms of lighting, on board ship.

The first marine electric lighting plant, installed in 1880 on the steamer Columbia of the Oregon Railway & Navigation Co., was so successful that other ventures were soon made, and of a total of 22,000 incandescent lights installed by October, 1882, 2,000 were reported on steamships, where they are of course almost universally used today. There are also electric signal and running lights with indicator telltale boards, and new uses for the searchlight are constantly being found on fireboats, patrol boats, lumber towboats, etc., in addition to the usual purposes of navigation and illumination.

The merchant marine has, however, been somewhat slow in adopting electric power, and the first complete power installation outside the navy has just been made on the mammoth Minnesota, of the Great Northern Steamship Co. This vessel has a generating plant of 450 K. W., and is wired on the 3-wire system, having 125 volt lighting circuits and 250 volt circuits for the

motors. The refrigerating plant has two 75 H. P. motors driving ice machines and two 60-in. motor-driven fans for the cooling apparatus; the steering gear is arranged for operation by electricity as well as by steam; the laundry has a 10 H. P. motor; the machine shop, two 10 H. P. motors; and the hull is ventilated by seventy-two motor-driven blowers. There are thirty-eight electric deck winches, seven electrically operated centrifugal pumps, one electric capstan and two coal conveyors operated by motors as well as numerous electric signals, telegraphs, etc., including an electric whistle with clock control for signaling in fog.

The auxiliaries mentioned above are, of course, scattered over the whole ship, and the flexibility and simplicity of electric wiring in comparison with the unwieldy steam piping will be apparent. Steam pipes running to all these auxiliaries would have the further disadvantage of heating the passages and compartments through which they pass. In point of economy also it is well to consider that small auxiliary engines, with their losses from leakage, condensation and radiation, are very inefficient, the average steam consumption on one of the navy cruisers fitted with steam auxiliaries having been found to be as high as 119 lbs. per indicated horse power in a series of tests, the auxiliaries taking about 23 per cent of the total amount of steam used on the ship. In a plant like the Minnesota's, large economical engines generate the power in one place, and it is then easily distributed, now for lights and now for motors, according to the need. This will be found of great advantage when the steamer is at the dock and using only a few of her auxiliaries.

In the navy, electric motors for the military auxiliaries have been extensively used for some years past, but new applications are being made here too. Complete electric systems for the operation of watertight doors and hatches are installed, which can be controlled from one central station or at the door of each compartment at will; electric pumps are employed for various purposes; and motors are used in the laundry and workshop, and on dish-washing and dough-kneading machines in the galley.

Electric heating and cooking devices have not yet been widely used on board ship, although they would seem to be useful and attractive additions to the equipment of a first-class passenger steamer. Kitchen stoves and ovens in a number of sizes can be had, as well as a variety of designs in water heaters, air heaters, coffee pots and chafing dishes for the staterooms and other parts of the ship. Undoubtedly the future will see the culinary department of passenger steamers operated by electricity owing to its convenience, cleanliness and the possibility of employing systems of cooking, such as old fashioned roasts, before open fires, which are not practicable under ordinary conditions aboard ships.



### "THE MAN AT THE WHEEL"

The Marine Review has had much to say during the past year concerning the indifference, or worse, of our national legislators to the piteous appeals that have been made for relief by the removal of some of those embargoes that have made ship building and ship owning upon salt water impossible as American industries.

Particularly have we upon one or two occasions referred to the extraordinary and altogether incomprehensible attitude of Alfred Lucking of Detroit, Mich., member of congress and of the committee on Merchant Marine and Fisheries, who became somewhat notorious in the last session of congress for his policy of obstruction and destruction whenever this one topic was under discussion, and the question has been asked upon several occasions:

Why did he do it?

He was not noted particularly for anything else; practically was never heard of on any other subject; apparently had no other great interest in national legislation on any question, but whenever the desirability of seriously considering any point bearing upon the great merchant marine issue in any of its many phases came up, Mr. Lucking was right on the spot, waiting, watching, eagerly to throw every possible obstacle in the way of even a calm, dispassionate discussion of any part of the one great national unsettled issue before the American people.

Why did he do it?

He was not known to have introduced or fathered any sort of remedial legislation (to do that would have required a knowledge of the subject and a desire to see conditions improved), but his one object in life, the beginning and the end of his ambitions, and all the apparent excuse for his presence in Washington would seem to have been not only to prevent any thought of improvement, but to labor unceasingly to drive the American flag and American ship from off the high seas for ever and all time.

Why did he do it?

Of course, the accomplishment of this purpose could hardly be expected if honorable means were employed, and so resource was had to a few little old tricks that have always been resorted to by the politician, but never by the statesman.

Why did he do it?

Chief among these was the constant beating of the tom-toms and the continual use of the word "subsidy," both in congress and in the columns of a few ignorant newspapers of his own district, when, as a matter of fact, there was not proposed by any congressman for consideration during the last session of congress a single measure that in any way, directly or indirectly, suggested the payment of any subsidy as a measure of relief, in whole or in part, to cure any of the many evils that all must concede exist and are steadily driving the stars and stripes off the ocean highways and are a source of detriment to all our commercial interests, to every manufacturer, to every employer and to every employe in this broad land.

Why did he do it?

But, relying upon a certain well known prejudice to the payment of American marine subsidies, that has been fostered and encouraged upon every possible occasion by the foreign owners who control practically all of the transatlantic lines doing business with the United States (because there are practically no American ships left) we find Mr. Lucking getting frantic every time the subject or any question bearing upon it is under consideration. Then, concealing his real motive by the hysterical and frequent use of the word "subsidy" (when no subsidy had been suggested) he has tried to

justify his course in opposing every move made that might tend towards any equitable adjustment of this great question.

Why did he do it?

There were three measures only offered for consideration that were of paramount interest to our merchant marine and each of them offered our friend from Detroit a fresh opportunity to prove his loyalty—not to his own city, which has been greatly benefited by the existence of the coasting laws which have encouraged ship building and ship owning—not to his own country or its flag that is the laughing stock of all the first-class, as well as the second and third class nations of the world—because, while first in nearly every other respect, the United States is last and behind all others, including England, Germany, France, Holland, Russia, Austria, Italy, Japan, Turkey, Norway and Spain, all of whom have a larger sea-going merchant marine than this country—but it gave the representative from the first district of Michigan an opportunity to prove how thoroughly he was in sympathy with those interests that so greatly fear that Uncle Sam may undertake to do in this direction as he has done in nearly every other, namely, take first place.

Why did he do it?

The first measure (senate bill 2263) provided simply that preference should be given American ships by the American government in the transportation of naval and army supplies when these had to be shipped to distant parts of the globe; subject to a proviso that in case an unreasonable price was asked by American ship owners, that the government officers would have the right to choose the ships of any nation they saw fit. Here was where the foreign transportation companies and their agents saw the loss of one great source of profit, and Washington quickly filled with an "influential" lobby that got busy among those they could depend upon, but the bill was finally passed in the face of the hysterical protests of the Detroit congressman and some of his friends.

Why did he do it?

Then came the bill (senate bill 2259) for extending the coasting laws to the Philippine islands; thus making it necessary to carry all the commerce between the islands and this country in ships carrying the stars and stripes. This was the signal for a grand call to arms and the representatives of the shipping interests of England, Germany, Norway, France, Italy and other countries who had grown wealthy out of our commerce hurried to Washington and hasty conferences were held with their friends, and as a result the air was filled with more wild-eyed talk about "subsidy," when as a matter of fact, the bill did not call for the appropriation of a five-cent piece, and there was a shout from Mr. Lucking, and carefully prepared articles appeared in some of the Detroit papers about some vague mysterious "shipping trust," while a schoolboy should know that no one can corner the right of way upon the oceans of the world, and anyone can sail a ship who can buy it or build it, and with the right of way free, how could there be a trust.

Why did he do it?

But, here was where the enemies of the stars and stripes determined on a great stand. They declared at first that the Philippine commerce did not amount to much, and that later on it would bring fearful, awful ruin upon the poor, dear, little Filipino if this was done, as it would probably increase the freight rates, and that it would be an especial hardship upon the hemp cordage trust who were the chief importers from the Philippines.

Then they varied the argument a little—something had to be done—and our Detroit friend was especially vehement in declaring that there were no American ships and it would



take years to build a sufficient number to take care of the trade, which had steadily grown to enormous proportions in his imagination, and was going to grow faster, and then there was more bluster, more vehemence, more hysteria, more noise, more misrepresentation, but in spite of the opposition of this little clique, and some of the "suddenly grown great" satellites, the bill passed after having been amended to please the foreign ship owners and their friends so that it would not become a law before July 1, 1906.

It was shown conclusively by a report of the majority of the members of the committee, that there was more than double enough available tonnage to take care of the business immediately without any delay, that, in fact, in the American harbors of both the Atlantic and Pacific oceans could be seen American built, American owned ships of modern design tied to their moorings, rotting and rusting into decay; ship yards falling into disuse, idle workmen walking the streets, while our rapidly increasing commerce to and from this country at the rate of thousands of tons daily was being carried in foreign ships.

Why did he do it?

To bring the matter right home to Detroit and the great lakes. Within a week of the time that a leading Detroit paper published statements that they would never have allowed to appear in print had they known the facts; there appeared an item to the effect that certain large steel steamers of modern design and construction, built by the American Ship Building Co. and owned partially in Detroit; which were taken in two sections to salt water and there put together; were sold at auction in New York harbor to satisfy the bond holders, as the ships had never been able to earn a dollar; had never been able to run successfully in the face of the subsidized steamers of foreign countries, and they are still idle and their owners—some of them Congressman Lucking's constituents—wonder why the government of the United States should discriminate against ship owners and ship builders and decline to legislate, if it were ever so little, in such a way as to make the American ship a possibility.

Why did he do it?

During the months that Congressman Lucking was working overtime, waving his arms, pounding the furniture and getting worked up over the possibility of something being done to remedy this state of affairs, the ship yards of the great lakes, and those in his own city, were practically idle, although they are fully equipped and are as well able to construct ocean going vessels of certain size, of which there are hundreds in use, as any American ship yard on the coast.

Why did he do it?

During the very time that he was working night and day to prevent any effort being made to remove the restrictions which had made American ship building and American ship owning for the foreign trade impossible, ship yards and workmen right in his own district were idle and out of work, when a very little consideration of this question in congress would have started the wheel going to give immediate assistance in helping the American nation to regain some of the ground lost.

Why did he do it?

The Brotherhood of Boiler Makers & Iron Ship Builders, one of the strongest and most conservative labor organizations of this country, with thousands of members on the great lakes and hundreds in his own district, had at various times adopted strong resolutions in favor of the government of the United States doing as other countries had done with reference to the merchant marine, but these resolutions and appeals for support were scorned by the congressman from the first district of Michigan. These resolutions were as follows:

"In the name of 24,000 American workingmen, members of the Brotherhood of Boilermakers and Iron Ship Builders of America, with 500 lodges in as many different parts of the United States, we most respectfully ask you to support the following bills now pending in congress, on the sole ground that their passage will mean more work for our members at their trade:

"Senate bill 2,259: 'To regulate shipping in the trade between the ports of the United States and ports or places in the Philippine islands,' and house bill 12,222, which is the same thing; senate bill 2,263, 'for the carriage of government war and naval stores in American vessels,' and house bill 16,139, which is the same thing; and house bill 7,056, 'creating a commission to consider and recommend legislation for the development of the American merchant marine.'

"We are not interested in trusts, combinations or monopolies; we have neither political nor partisan interest in these bills; we want them passed because they mean work for us at our trade.

"American ship builders cannot build ships as cheaply in the United States as foreign ships are built, largely because the wages men of our craft receive, which are far higher than obtained in foreign ship yards and boiler shops. We stand for the American standard of wages and of living, and are better citizens because we enjoy them. We want no diminution in our wages and no reduction in our style of living; but we want to stand, as do workingmen in other trades, on the American level. They are able to do so, largely, because our government protects them against the free competition of foreign products. Our ships in the deep sea trade are unprotected, and so cannot compete with foreign ships. Congress should remedy this condition, and this we ask. The bills above named will help, wherefore we again appeal to you to work and vote for them, in the interest of American workingmen."

Why did he do it?

The National Association of Manufacturers, an organization comprising thousands of members scattered all over America and containing the names of every very large and responsible manufacturing concern in America, likewise adopted resolutions calling upon congress to do something to alter the situation, which was having an injurious effect upon the commerce, upon the manufacturers, and indirectly upon the working people of this country, but these resolutions were likewise ignored and scoffed at by the gentleman from Michigan.

Why did he do it?

The National Board of Trade of the United States, a large number of local Boards of Trade, Chambers of Commerce, associations of manufacturers of every description, adopted similar resolutions on behalf of themselves and members, all of which were presented to the committee on merchant marine and fisheries of which Congressman Lucking was a member, without ever for one moment causing him to alter his policy or give ear to the pleadings of those whom he was supposed to represent, in preference to the arguments of the glib-tongued representatives of the foreign ship owner who were so fearful that the congress of the United States would recognize the importance of this question and deal with it justly.

Why did he do it?

It is a matter of record that in the last seven years congress has appropriated \$238,000,000 for railroad subsidies, and on top of that has paid out over \$31,000,000 for the purchase of cars for the railroads, and a good portion of this was appropriated during Congressman Lucking's term in congress, but neither the Detroit papers nor Congressman Lucking himself are going around boasting that he ever raised his voice once to offer the slightest opposition to this sub-

sidy, which, in some cases, is pretty generally conceded to be an extravagant and unnecessary expense.

Just think of it. During the present year \$96,000,000 was appropriated for the support of the navy of the United States; over \$31,000,000 being appropriated for ships now under construction; all to build up a navy, but practically no money whatever being expended to build up a merchant marine. Other countries, without any exception, have built their merchant marine first, and the navy afterwards to support and protect their merchant vessels, but owing to the influence wielded by Congressman Lucking and those who were "persuaded" and "influenced" to vote with him, the American merchant marine will soon be entirely extinct.

Why did he do it?

We are going to spend \$200,000,000 to build a canal in Panama to benefit the commerce of foreign countries, because there are practically no American ships to pass through it. We have spent hundreds of millions of dollars to help and free the Cubans; we spent hundreds of millions of dollars to help the Filipinos; we spend millions upon our army, and upon other items that it is not our intention to criticize, but when the question arises as to the desirability of spending one one-thousandth part of this amount to assist and build up an American merchant marine, that would bring back to the country ten dollars in trade, commerce and prosperity for every dollar so expended, the influence of Congressman Lucking and those associated with him can be depended upon to antagonize every possible interest of the United States, its institutions and its people.

Why did he do it?

Then came finally just before the closing of congress at Washington, the Gardner bill (house bill 7,056) a measure that provided for the appointment of a non-partisan committee of five senators and five congressmen, to be selected from prominent members of both houses and both parties, who had given this subject thought and whose purpose should be to visit different cities of the country where such information could be obtainable, interview all classes of citizens, those who are engaged in shipping and those who are not, employers and employees alike, and make a report to the next congress as to their findings, and submit at the same time, if possible, some sort of a recommendation as to the best course to pursue.

It is not reasonable to suppose for one moment that the fearful, bitter opposition to this measure on the part of the congressman from the first district of Michigan and some of his friends was uninspired. It is inconceivable how anyone who claims to be an American citizen, representing what in some ways is practically a marine constituency, claiming to be loyal to his country and its institutions, desiring its prosperity and the prosperity of its people, could, without some sort of tangible or intangible influence from outside sources ever had displayed the measure of unholy zeal shown by this gentleman in opposition to this measure. It was simply a bill authorizing the appointment of a reputable committee of reputable men, selected from both parties to learn; first, the truth, and, second, to submit the truth and facts as it found them, to the citizens of the United States. And, if ever a human being in the history of this country, or any other country, consecrated himself to any one cause, let it be worthy or unworthy, Congressman Lucking devoted himself to defeat that measure, and, failing in that, to so curtail its provisions as to make it inoperative.

Harsh as the foregoing may appear, it is a fact as shown by copies of the congressional records and statements appearing in some of the Detroit daily papers from time to time, speeches published and distributed with a misleading purpose, by himself and others associated with him, and by the records that can be easily obtained by any American citizen. Not a

word of the foregoing can be disputed. It contains the shameful record of disloyalty to an issue that our country and Detroit citizens should hold dear, and while it is almost inconceivable that any man could be found who would assume such a position and afterwards openly and brazenly attempt to justify himself. The foregoing is but a brief resume of Congressman Lucking's position upon this greatest of all questions yet remaining to be settled by the American people and for the American people; and the question that must be in the mind of every Detroit citizen for all time to come is:

Why did he do it?

Why did he do it?

#### INSURANCE LOSSES NOT LIGHT

Buffalo, Nov. 2.—Someone lately sent out the report, probably intended to be very comforting, that the marine losses this season were light, but our lake underwriters refuse to be comforted by it, as they do not find the facts to be in accordance, so one of them has asked me to make a counter statement as such an impression is not only annoying, but it is likely to harm. It gives the vessel owners an idea that they are paying more for their insurance than they should, and it is likely to invite certain eastern insurance people, who have not followed the business very closely, to congratulate themselves on a good season and when they find that it is not a fact they may ask some unpleasant questions.

When the season was about half gone it did still look as if there was going to be a good margin of profit in the business, especially as to hulls, for it will be noted that most of the large losses have been since the middle of the season. This has happened in some part because the season was well started before there were any boats moving except lumber barges and a few that did not belong to the Lake Carriers' Association. The lockout was not broken fully till June 14 and though hull rates did not go lower on that account there were very light cargo insurance earnings and they are still all too light.

It is true, so far, that there are decidedly fewer total losses this season than there were last and that is what has probably deceived the lake man who has set himself up as an authority in the matter. If total losses were the great item in the lake business these days there would be much reason for congratulation. They were large last season, as there was a big exodus of the remnant of the wooden fleet. If the steel hulls had any such habit of growing old as have the wooden ones, past their best in ten years, there would indeed be reason for alarm to all branches of the lake trade.

But it somehow has developed that a steel boat is about everlasting. That is to say, the metal does not degenerate to any great degree when it grows old and when it is punctured or put out of service by contact with rock, or something else, the plate comes off and is replaced by a new one or is mended and put back. It is well that the steel fleet is so largely up to date, or there would soon be a fleet that nobody wanted.

It is getting to be an easy matter to estimate off hand the loss on a steel bottom that has come in contact with the rocks. Of course, it will not answer for more than a guess, but it has so often been found that the cost of repair was \$500 a plate that the figure is quite often given as a starter. This is really the vulnerable point with the steel hull. A rake across a rock bottom and there is a \$10,000 repair bill run up in a few moments. Collisions and fires are, or ought to be, less common than they used to be, but the strandings are alone equal to the emergency of filling the repair docks. And the worst of it is that this class of accident is not likely to grow any less right away.

Here are the Ramapo, the P. P. Miller, Buffalo steel bot-

toms, that have been raked lately for several thousand dollars apiece and there are the Wawatam, the D. G. Kerr, the J. H. Reed, the S. N. Parent, and S. R. Kirby, also prominent in that line not long ago, with many minor losses in the same class. It would be impossible for anyone to say how many such accidents have taken place this season, for they are never all reported at once, spite of the efforts of the underwriters to get hold of them.

Following up the serious losses into the collision class there may be mentioned the Cranage-Melbourne, Chili-City of Berlin, H. W. Oliver-Ira H. Owen, Ottawa-Midland Queen, G. L. Craig-George Markham, most of them unadjusted, but all sufficient to show that this style of loss is always to be large.

Fires, especially in the lumber fleet, have been numerous of late. The lumber barges E. H. Strong (steamer), Congress, F. B. Gardner, Kate Darley and we may also add the Verona, have gone up in fire not long ago, though the Verona may have been classed as a last season's loss. The Iron Chief and Sitka went the way of old vessels that could no longer cope with the sea. The great cargo loss so far is that of the F. H. Prince, whose rubber goods will long be recalled as very slippery and unsatisfactory.

Here is a list of only a score of craft, gathered up in a sort of off-hand way, that will cost the insurance companies close to half a million before their owners are made good for the losses to them and their cargoes and there are six weeks still of the worst of the season to be gone through, though it is a fact that the lake navigator fears the weather much less than he did twenty years ago. The grim remarks about some skipper gone up the lakes in a floating coffin are seldom heard now.

JOHN CHAMBERLIN.

#### CONTRACTS FOR MORE SHIPS

The American Ship Building Co. closed contract last week with Mr. Dan A. Hanna and others of Cleveland for two large freight steamers for next spring's delivery. The two vessels ordered by Mr. Hanna will be duplicates of the steamers building for Mr. G. A. Tomlinson of Duluth at the West Bay City yard. They will be 524 ft. over all, 504 ft. keel, 54 ft. beam and 30 ft. deep. They will have triple-expansion engines with cylinders 23½, 38 and 63 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers 14½ ft. in diameter and 11½ ft. long, fitted with Ellis & Eaves draft. They will be of arch construction and will have a carrying capacity of 9,000 gross tons of ore. One of the steamers will be built at the Cleveland yard and the other at the Wyandotte yard, and both are promised by next June.

The Niagara Transit Co., represented by Mr. Harvey L. Brown and W. Mills of Buffalo, gave a contract this week to the American Ship Building Co. for a steamer to carry 10,000 gross tons of ore. The new steamer will be 545 ft. over all, 525 ft. keel, 55 ft. beam and 31 ft. deep. She will have thirty-two hatches and her hull will be designed in accordance with the latest practice. Her double bottom will be 5 ft. deep at the center line and will for ballast purposes extend up each side of the vessel to the main deck stringer. Her engines will be triple expansion with cylinders 23½, 38 and 63 in. diameters by 42 in. stroke, supplied with steam from two Scotch boilers 14½ ft. in diameter and 11½ ft. long, allowed 180 lbs. pressure and fitted with Ellis & Eaves induced draft. The American Ship Building Co. has orders now on its books for seventeen vessels and contracts are pending for others.

Mr. Antonio C. Pessano, president and general manager of the Great Lakes Engineering Works, closed a contract last week with the Anchor Line for the construction of a new 5,000-ton package freight steamer to be a duplicate of the steamer Muncy. The general dimensions of the new steamer will be 350 ft. long, 46 ft. beam and 30 ft. deep. She will have quadruple expansion engines and Scotch boilers and the con-

tract calls for delivery in October of next year. This makes seven vessels for which the Great Lakes Engineering Works now has contracts and negotiations are pending for additional vessels.

Preparations for laying the keels of the new steamers for the Pittsburg Steamship Co. at the South Chicago yard of the American Ship Building Co. are practically completed. The Chicago & Great Lakes Dock Co. started at once to dredge the slips in order to accommodate the added length of these great steamers. The slips will extend 600 ft. from the Calumet river.

#### CHICAGO GRAIN REPORT

Chicago, Nov. 1.—The total weekly receipts and shipments fall short of previous week and a year ago but vessels having been only in moderate supply rates were well maintained in range from 1¼ cents to 1½ cents per bu. Buffalo corn. The 1½ cent figure obtaining on certain vessels was suited to quantity offered and location as well as October clearance. All water routing to Montreal continues nominal basis 3¾ cent corn.

Effective Nov. 1 that at and east of Buffalo rates are 4½ cents per bu. on wheat and 3½ cents on corn, which notes an advance of ½ cent per bu. over the October rates and a further advance of ½ cent per bu. is contemplated to take effect Nov. 15.

Liners dealing slightly in small lots at a good premium over going cargo rates although their package freight demand bids fair to require their entire attention during balance of season. Cash grain conditions working more favorably and in general rather good expectation that November will develop a profitable movement.

The distribution of total weekly shipments is as follows: Via all-rail lines of wheat 355,000 bu., corn 230,000, oats 715,000, barley 138,000. Via lake to Buffalo, etc.: wheat 78,000 bu., corn 800,000, oats 435,000, barley 130,000. And to Canada ports via lake, corn 72,500, oats 58,000, barley 33,000.

#### Lake and rail shipments—

	This week.	Last week.	Same week last year.
Wheat .....	433,989	860,732	1,138,316
Corn .....	1,105,462	1,073,333	2,751,359
Oats .....	1,211,775	1,200,254	1,495,259
Barley .....	301,518	248,649	81,840
	3,052,744	3,382,968	5,466,805

	Shipments since Jan. 1, 1904.	Same time last year.
Wheat .....	13,729,270	19,294,621
Corn .....	63,293,881	79,066,585
Oats .....	39,539,669	55,302,256
	116,562,820	154,263,462

#### Stocks of grain in elevators—

	This week.	Last week.	Same week last year.
Wheat .....	4,510,000	4,503,000	5,209,000
Corn .....	1,755,000	2,646,000	4,204,000
Oats .....	9,805,000	10,009,000	2,825,000
Rye .....	701,000	694,000	238,000
	16,771,000	17,852,000	12,476,000

The annual meeting of the Great Lakes Engineering Works of Detroit was held on Tuesday of this week, the stock holders paying a visit to the ship building plant at Ecorse on the steamer Pleasure. Mr. A. C. Pessano, president and general manager; Mr. John R. Russel, secretary and treasurer; Mr. Henry Penton, constructing engineer, and Mr. John A. Absdell, superintendent, were complimented upon the work accomplished during the year, seven ships being now under contract and one completed.

## FREIGHT SITUATION

While ore shipments for October have not yet been compiled it is known that they are very heavy and authorities believe that they will exceed the September shipments when over 4,000,000 tons were sent down the lakes. This enormous movement was accomplished in the face of violent weather and a badly congested condition at Lake Erie docks, showing that the commerce of the lakes may easily be handled within wide latitudes by the existing fleet. The demand for ore vessels has been quite brisk throughout the month, but owing to the scarcity of coal, very little of which has been coming to Ohio ports, rates have been held at the old basis. A number of owners, however, will have carried all their contract ore within two weeks so that given a free movement

## ELEVATOR WRECK

The Ontario grain elevator at Buffalo collapsed last Sunday and is now nothing more than a mass of debris. The elevator was built in 1890 and was one of the big structures along the lake front that could be seen all over the city. The elevator was heavily loaded with grain at the time, probably containing 250,000 bu., nearly all of it barley. The cause of the wreck is now the subject of investigation. It was at first thought that the wreck was caused by an explosion of mill dust, but some doubt was cast upon this theory by the fact that the entire building slipped from its foundation and slid about 60 ft. into the Evans ship canal. This condition gave rise to the report that the wreck was caused by the collapse of the foundations of the elevator. It will require an examination,



WRECK OF THE ONTARIO GRAIN ELEVATOR AT BUFFALO.

ore rates could not materially advance. It is expected that November shipments will be quite heavy and that the gross total of ore brought down at the close of the season will not show any great shrinkage over that of last year. In fact, time considered, the movement of ore this year has been much greater than that of last, but the season this year did not open until June 15.

The grain trade has been extremely light for some weeks past but lumber carriers are in very good demand.

Charles F. Bielman has been awarded the contract of delivering the mail at the marine post office at Detroit for a period of four years and eight months, beginning Nov. 1. Mr. Bielman has held the contract since the marine postal service was established in 1896.

The steamers Arabia, Vanderbilt and Montana of the Western Transit Co. have been purchased by Michael Galvin of Buffalo.

however, to determine the exact cause of the destruction of the building. The loss upon this structure and its contents is estimated at \$300,000. The accompanying photograph will show how completely the building was wrecked.

The steamer Woodruff, the thirtieth and last test boat to be engaged by the new electric Brown machines, which were erected at the port of Conneaut last winter, was worked out by the battery of new machines last week. According to the guarantee the machines were to be tested on thirty cargoes and as their work has equaled the guarantee the battery will soon be accepted.

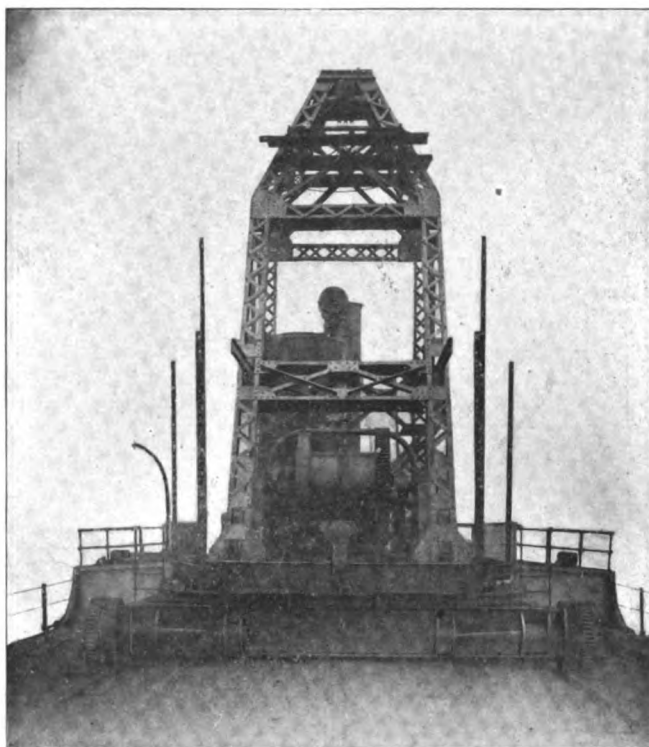
The steamer Augustus B. Wolvin, drawing 18 ft. of water, negotiated the four miles of river to the blast furnace at Lorain last week without the aid of a tug, and at only one point in the river was difficulty encountered. A shallow spot was found in the middle of the channel near the steel plant. The Wolvin grounded there but was able to get off by her own exertions.



### REVOLVING DERRICK ON LIGHTER RESCUE

The lighter rescue built by the American Ship Building Co. for the Great Lakes Towing Co. has proved herself a very serviceable craft in the wrecking work which she has had to do.

The revolving derrick, so conspicuous a feature on the Rescue, was built by the Macbeth Iron Co., Cleveland, and is an exceptionally heavy machine. It is capable of lifting over ten tons, is of new design throughout and embodies many features not found in any other machine. It is self-contained and mounted on track wheels 17 ft. 6 in. gauge and is capable of performing by its own power, the operations of traveling,



REVOLVING DERRICK IN LIGHTER RESCUE.

rotating, hoisting, operating automatic bucket and raising and lowering boom. All this is accomplished by a double horizontal engine with cylinders 12 in. diameter by 16 in. stroke. Steam is supplied by a vertical, submerged flue boiler, 60 in. diameter and 132 in. high, provided with steam dome and separator.

The engine and drum frames are cast together and the general arrangement of the machinery is very compact and at the same time all the parts are readily accessible. The gears for driving the different drums have cut teeth, which of course not only increases the efficiency, but makes the machinery run very smoothly. All bearings, moving parts and loose gears are either babbitted or brass bushed and faced.

The lower and upper frames are constructed of heavy steel beams and channels, and the arrangement is such that a very low machine is obtained; machinery, boilers, etc., being from 4 to 5 ft. lower than in any other machine of similar type and size. This getting the center of gravity so low is, of course, of great advantage to a machine of this character. The boom is 60 ft. long and is of steel construction throughout, as well as the mast and batters for carrying the same.

This machine is equipped with two automatic clam shell buckets both made by the Macbeth Iron Co.; one, the "Swedenborg," is used for handling the heaviest materials, such as iron ore, bituminous coal, etc.; it is rated at 2 cubic yards capacity and has been handling over 4 tons of iron ore. The

other bucket, the "Williams," is of 3 cubic yards capacity and is used for handling grain, anthracite coal, etc.

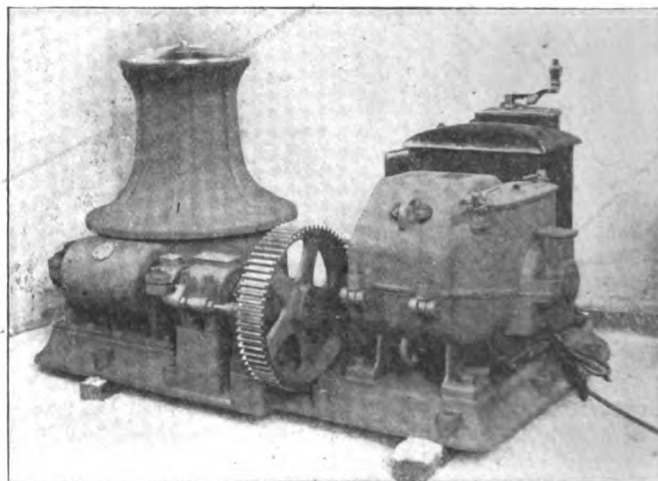
### PRODUCTS OF THE HYDE WINDLASS CO.

The products of the Hyde Windlass Co., Bath, Me., are well known from one end of the land to the other. Their steam windlass is known as the vertical type and consists of two vertical shafts driven by worm gearing, direct from a worm located on the continuation of the crank shaft of the engine, without the intervention of countershafts or bevel gears. Each shaft has on its upper end above deck a wildcat with locking gear complete. The arrangement is such that the wildcats can be operated together or independent of each other. The wildcats revolve in a horizontal plane and take in the anchor chains on the outboard side. The chains then make a half turn around the wildcat and pass through opening in the windlass bed-plate down to chain locker. Gypsy heads of large diameter are fitted on over wildcats to use for warping purposes.

The vertical shafts have a coupling just above the worm gears, so that either worm gear can be readily removed and leave the other side intact. Friction band brakes are fitted to each wildcat, controlled by screw hand wheels set close to wildcat. The worm is of bronze and arranged to run in a bath of oil. The worm gears are covered with a cast iron casing.

The double engine located on the deck underneath the windlass is fitted with a link reversing gear. All the bearings of engine are lined with composition alloy. An independent thrust bearing adjustable for wear in either direction is fitted between the worm and engine for taking the thrust of worm. Some of the advantages of this type of windlass over the horizontal type are: Less space is required on upper deck, the engine with gearing is not exposed to the weather, the strain exerted by the chain is close to the deck and the chain has a more secure hold on the wildcat.

This windlass was furnished for the Great Northern Steam-



ELECTRIC DOCK CAPSTAN.

ship Co.'s steamers Minnesota and Dakota. A similar windlass was furnished for the Turkish cruiser Medjidia, and at the present time the company has a large number of this type of windlasses under construction for United States naval vessels.

The company also makes a steam dock capstan, designed for dock use and also as a warping capstan on steamships. The engines and gearing are arranged in the base under capstan, with large doors on the sides of this base, so that all working parts are readily accessible. This does away with the danger of ropes getting caught in the engine and makes a very compact and symmetrical designed machine.



The capstan is a combined steam and power capstan. The head of capstan is provided with bar holes for capstan bars, so as to be worked by hand when desired. When worked as a simple capstan the men pushing on the capstan bars walk right-handed around the capstan; for a power capstan the men go around the capstan in the opposite direction and the barrel of the capstan turns about one-third as fast, thus increasing the power about three-fold what would be obtained when operated as a simple capstan. The capstan barrel always turns right-handed. By inserting a pawl in the lower part of barrel, the capstan is locked to the shaft and can then be operated as a steam capstan.

The company also manufactures a compound geared electric deck winch, a type of winch which is now fitted on board vessels for the United States navy. All the electrical and mechanical parts are self-contained on one bed-plate, making a very compact machine. At the same time all parts are readily accessible. This winch is used for handling coal and other supplies, and also for warping purposes. As a power winch it has a capacity of 13,200 lbs. at 50 ft. per minute, while with the speed gearing it has a capacity of 3,000 lbs. at 220 ft. per minute. On each side of the winch is a gypsy end of good size, turned smooth. The hand wheel shown is used to change the gearing from speed to power, or vice versa. Foot brakes are provided for holding the load. All the operating mechanism is within easy reach of one man.

The Brown steam tiller is a type of steering gear which is well adapted for large vessels. It consists of a long tiller keyed to the rudder head; the other end rests on bearings on a radial toothed rack, and carries a driving pinion. A double engine is bolted to the tiller, so that the motion is given to the tiller through a worm on the crank shaft of the engine, driving a worm gear on the upper end of the pinion shaft, which is carried in the jaw end of the tiller. An expanding clutch is fitted to the worm gear. Thus, in case a heavy sea strikes the rudder, it immediately slips and the rudder moves out of position, but by this act the steam valve is opened and the rudder moves back to its normal position.

All working parts of the engine are entirely enclosed in an oil tight casing and the working parts are thoroughly lubricated with oil from an oil pump worked from the eccentric rod of the engine. A segment is bolted to the rudder end of the tiller and serves as a means of connecting through suitable gearing to the hand wheels for steering the vessel by hand.

A small Brown midship steering engine is also made to be used as an auxiliary power for steering through the hand gearing. The operating valve of the engine is controlled by suitable levers to a motor cylinder which is in communication with a Brown hydraulic telemotor, located in the pilot house, by two copper tubes.

This steam tiller and telemotor has been fitted on the principal Atlantic liners such as the Campania, Lucania, Kaiser Wilhelm der Grosse, Deutschland and others. The following American-built steamships are also equipped with this gear: Nevada, Shawmut, Tremont, Korea, Siberia, Denver, Zealand and Kroonland.

A steam brake windlass and warping winch is also manufactured to be located in the fore-castle deck with engines for driving windlass on deck below. The vertical shaft, driven through bevel gears from engine, has keyed to its upper end two bronze worms; one is in mesh with a large worm gear carried on windlass shaft, the other is in mesh with a worm gear keyed to winch shaft, forward of windlass. Both shafts are contained in the same housing. The ratio of gearing is such that the winch shaft turns about five times, while the windlass shaft turns once. This would give a speed of rope on the forward gypsy head five times that on the aft gypsy head.

Two wilcats with their locking gear and purchase bands are carried on the windlass shaft. Each wilcat is so ar-

ranged as to be worked independent of the other, or both can be worked at the same time. A compressor band is fitted on each wilcat operated by a screw hand wheel. Purchase jaws and pump brakes are fitted on the windlass for heaving in the chain by hand power. The fast speed of winch heads makes this type of machine very convenient for handling lines rapidly when warping steamships at the dock.

The electric dock capstan, illustrated in the accompanying article, has been furnished the United States navy yard for use in warping vessels in the dry docks. Both the mechanical and electric equipment are self-contained on the same bed-plate. The machine is designed so that all parts are watertight, and thus can be located at any convenient place, exposed to the weather. Motion to the capstan is communicated through a pinion on the end of the armature shaft, driving a spur gear on the end of the shaft. A bronze worm keyed on worm shaft is in mesh with a worm gear keyed to the capstan shaft inside base casting under capstan. The worm is enclosed in an oil-tight box and runs in an oil bath. The thrust of the worm is taken on a thrust bearing adjustable for wear in either direction. A casing not shown in place is fitted over the gear and pinion. This makes a very powerful and convenient machine for warping vessels at a dock, or hauling loaded cars on a railway wharf.

### THE NATIONAL MOTOR BOAT SHOW

While perhaps some few years behind our foreign friends in the matter of motor boat sport or exhibits, it takes but a short time to equal and even excel once we get started. The remarkable showing made this season in racing speaks well of the rapid advancement of motor boats in this country and now comes the first national motor boat show, that promises to equal if not excel those of any foreign country. Under the auspices of the National Association of Engine and Boat Manufacturers the first national show will be held in New York city commencing Feb. 19 and extending to March 9. At no previous time at which motor boats took part as an exhibit in any show has there been the great interest taken or manifested as regards exhibits for this show. The applications for space has discounted anything in the past, more than one-third the exhibitors being those who have never before exhibited at a show of any nature. At present no details can be secured as to the arrangements made in connection with the opening of the show, but it is the general impression that the show will be opened by a high naval official of our government in keeping with the opening of like shows in Europe. All the leading manufacturers and builders of motors, boats and accessories have filed applications for space, which will make the exhibit one of the most interesting to all who are directly or indirectly interested and when the leading makes and designs will be on exhibition. The decorations as far as the motor boat and of the show goes, will be the American flags and the yacht pennants of all the leading yacht clubs of the country. The show, given in connection with the sportsman's exhibit, will be doubly attractive and the attendance will be from all parts of the United States as well as Canada.

James Brown & Son, publishers at Glasgow, have issued a little book entitled "Signalling; How to Learn the International Code of Signalling." All methods of signalling in use, including wireless telegraphy, are explained with diagrams. The price of the book is one shilling and as it brings the international code of signalling up to the present time it is an extremely valuable product.

### MERCHANT MARINE COMMISSION

The Merchant Marine Commission, which made a tour of the country during the summer to inquire into the state of American shipping in the foreign trade under congressional authority, will resume its hearings in the southern states next month. The following schedule of hearings has been decided upon: Galveston, Nov. 12; New Orleans, Nov. 14; Pensacola, Nov. 15; Brunswick, Ga., Nov. 17, and Newport News, Va., Nov. 19. It is considered probable that an additional hearing will be given the port of New York to give exporters an opportunity to present their views. Quite likely also an additional hearing will be held at Washington. It is, of course, too early to state what form of remedy the commission will recommend, but it is surmised that it will be in the nature of discrimination in tonnage dues and import duties.

### AVERAGE CARRYING CAPACITIES

In last week's Review it was shown that while the United States Steel Corporation has fifty-four vessels which carry between 5,000 and 7,000 gross tons, it has twenty-two vessels which carry under 3,000 tons, so that the average carrying capacity of its entire fleet is 4,568 tons. Comparisons with existing fleets show that the average carrying capacity of other fleets is higher than that of the Steel Corporation, although, of course, this may not be the case when the corporation succeeds in disposing of its smaller class of vessels, negotiations for the sale of which are now pending. The fleet on the great lakes which, at present, as a unit has the highest carrying capacity is that of Henry A. Hawgood of Cleveland, whose five vessels have an average carrying capacity of 6,349 gross tons. The present average carrying capacity of the Tomlinson fleet is 6,262 gross tons, but Mr. Tomlinson's fleet will take first rank next year when the five steamers now building for him go into commission. Four of these steamers are of 9,000 tons capacity and the fifth is of 8,500 tons and the average carrying capacity of his fleet next year will be 7,276 gross tons.

These figures are extremely interesting because undoubtedly in the evolution of the ore trade the moderate sized steel carrier will have to get out of it. Comparative tables are herewith published of the Tomlinson, Mitchell and Hawgood fleets showing their average capacities. The present average capacity of the Mitchell fleet is 5,453 gross tons but when the steamer now building at Lorain is finished the average will be lifted to 5,644 gross tons.

#### G. A. TOMLINSON'S FLEET.

Name of steamer.	Average carrying capacity, gross tons.	Average carrying capacity, gross tons.
Sultana .....	5,000	At West Bay City. 9,000
Sonoma .....	6,700	At West Bay City. 9,000
Sonora .....	5,000	At Detroit ..... 9,000
Sinaloa .....	6,700	At Detroit ..... 9,000
Yosemite .....	5,500	At Lorain ..... 8,500
Saxona .....	6,700	
Sahara .....	8,500	Total in one trip. <u>94,600</u>
Kensington .....	6,000	General average. <u>7,276</u>

#### MITCHELL & CO.'S FLEET.

Name of steamer.	Average carrying capacity, gross tons.	Name of steamer.	Average carrying capacity, gross tons.
Moses Taylor ....	6,400	H. S. Holden ....	6,400
F. H. Goodyear ..	6,400	Lagonda .....	4,800
James Gayley ....	6,400	J. J. McWilliams.	4,800
W. H. Gratwick ..	6,400	Major .....	3,000
J. J. Albright ....	6,400	R. L. Fryer .....	3,000
Walter Scranton ..	6,400	George T. Hope ..	2,200
William E. Reis ..	6,400		
Henry C. Frick...	6,400	Total in one trip.	81,800
M. A. Hanna .....	6,400	General average..	5,453 1-3

#### HENRY A. HAWGOOD'S FLEET.

Name of steamer.	Average carrying capacity, gross tons.	Name of steamer.	Average carrying capacity, gross tons.
Wisconsin .....	7,300	S. S. Curray ....	4,647
Umbria .....	7,300		
H. B. Hawgood..	6,250	Total in one trip.	31,747
Etruria .....	6,250	General average.	6,349 2-5

#### W. A. HAWGOOD'S FLEET.

Name of steamer.	Average carrying capacity, gross tons.	Name of steamer.	Average carrying capacity, gross tons.
Edwin F. Holmes	7,300	Olive Jeanette ....	2,443
Bransford .....	6,250		
J. M. Jenks .....	6,250	Total in one trip.	31,019
Harold B. Nye...	5,776		
Iosco .....	3,000	General average.	5,169 5-6

### AROUND THE GREAT LAKES

The Great Lakes Towing Co. has leased the old Wells elevator property on the Buffalo river and will establish its Buffalo offices there. The property has a frontage of 280 ft. which will give ample room for the tug fleet.

A survey of the injuries to the steamer P. P. Miller, lately ashore off Simmons reef, showed that twenty-five plates will have to be removed forward as well as ninety-five frames, twenty of the latter to be replaced by new ones. It will take two weeks to make the repairs.

It is understood that eastern parties are thinking of buying a number of the small vessels of the Pittsburg Steamship Co.'s fleet for salt water use. Mr. Harry Coulby, president and general manager of the company, has put a price upon several of the small carriers which eastern interests are now considering.

The steamer Eliza H. Strong loaded with lumber and having the schooner Our Son in tow, caught fire in Lake Huron off Port Sanilac last week. The tow line was at once cast off and the Strong headed for shore with the crew working hard to subdue the flames. The fire gained such headway, however, that the crew were forced to take the yawl boat and reached the shore in safety. The steamer City of Holland was in sight and succeeded in towing the Strong into shallow water. The Strong was owned by the Strong Transportation Co., Tonawanda.

A dispatch from Washington announces the return to Detroit of Col. Garret J. Lydecker who for eight years prior to Jan. 14, 1902, was United States engineer in charge of the Detroit division. Orders have been issued by the war department removing the central division of the army engineering service from Cincinnati to Detroit with Col. Lydecker in command of the division. The district engineers at Detroit, Grand Rapids and Cleveland are to report to Col. Lydecker instead of to Col. O. H. Ernst whose headquarters for the north-western division are located at Chicago.

If experiments now being made with the concrete superstructure for the piers along the government ship canal at Sault Ste. Marie prove satisfactory it is probable that in the future the piers will be made of concrete above the water line as fast as repairs are made. The estimated cost of the work is about \$20 per foot and as there are about 3 miles of piers altogether the cost would figure something over \$300,000. Another improvement that will be begun at Sault Ste. Marie as soon as the rivers and harbors bill passes will be the widening of the ship canal above the locks. This has long been needed and the cofferdam has already been constructed so that it will be possible to start the work as soon as the money is forthcoming. The widening of the canal will do away with much of the current occasioned by the filling of the locks and will give more room for vessels. The building of so many big boats of late and the prospect of more in the future makes the improvement imperative.

## HERRESHOFF'S FAST MOTOR BOAT

The first long distance motor boat race in America took place on Saturday, Oct. 29, between Frank Croker's Xpdnc, designed and built by Nat Herreshoff; W. S. Kilmer's Vingt et Un II., winner of the A. P. B. A. gold challenge cup and Smith & Mabley's Challenger. The race took place on the Hudson River, N. Y., and the course, 118.6 nautical or 136.6 statute miles. The start was from a point opposite the club house of the Columbia Yacht Club, Hudson river and 86th street, New York city, up the Hudson to and around a tug boat anchored 1,500 ft. south of the bridge spanning the Hudson river at Poughkeepsie. Messrs. J. H. McIntosh and W. H. Ketcham of the A. P. B. A. was the race committee. The start was to have been made promptly at 10 a. m., but two hours delay was caused owing to the Xpdnc not arriving on time. It was 12:05 when the starting gun was fired, the Xpdnc crossing the line about 20 seconds was off with a terrific burst of speed, with Mr. Frank Croker at the wheel accompanied by the engineer and an assistant. An accident in the way of derangement of some part of the motor in the Challenger caused her several minutes delay in crossing the line after the starting gun was fired followed even more unfortunately in getting off after the Challenger. A. D. P. Smith had the wheel on the Challenger and Clinton H. Crane, designer of the Vingt et Un II., had the wheel of the latter. The course had been accurately surveyed by officials of the New York Central & Hudson River R. R. long before the time of starting. Thousands gathered to see the match race and all along the Hudson people turned out to get a glimpse of these speedy boats. The boats were accompanied for some distance by the Onontio, a very speedy motor boat which was not completed in time for the recent races for the gold challenge cup. She left the club house, exactly 32 minutes after the Challenger and was up with the leader at Yonkers. The conditions of the race was boat for boat, with no time allowance and if stops were made for gasoline the boat was the loser in the time it took to replenish the supply. The Challenger, unfortunate as she has been in all previous events, could not shake off the hoodoo, for while going at great speed and when opposite Haverstraw, N. Y., slipped a log in her propeller, damaging it to such an extent that she was placed hors de combat, leaving it for the Xpdnc and Vingt et Un II. to fight it out.

The Xpdnc passed by Newburgh, N. Y., at 2:02 on the trip up and the Vingt et Un II. at 2:45 p. m. Both were going at great speed, the Xpdnc showing greater speed than her opponent, the Vingt et Un II. At the stake boat the Xpdnc turned at 2:35:50. Vingt et Un II. 3:24:50. Both boats made beautiful turns, making a very wide sweep and continuing down the river on the return. Mr. Croker's boat covered the up river leg in 2 hours 30.50 seconds, which is an average of 23.62 nautical miles or 27.17 statute, while the Vingt et Un II. averaged 17.86 nautical miles or 20.54 statute. On the return trip the Vingt et Un cut down the lead of the Xpdnc considerable and made the return in less time by 20 seconds than the Xpdnc took to make her up trip, while the latter took 2 minutes 41 seconds for her return trip. The loss of time in starting was indeed a great handicap to the Vingt et Un II. and the lead secured by the Xpdnc could not be overtaken so that the Herreshoff boat was a winner by 58 minutes, 30 seconds.

The boats carried the last of the flood quite a distance on the up leg with a light southerly air. Returning they met ebb tide, with southerly winds in their faces. All occupants of the boats were clad in oilers. It was indeed a great triumph for Capt. "Nat" Herreshoff after his having been beaten this summer, to produce a boat that may possibly prove a world beater. She certainly showed wonderful speed and in fact both boats showed remarkable engine endurance and reliability. The summary of race is as follows:

Sweepstakes race of \$1,500, between motor boats on the Hudson river, Saturday, October 29th, 1904. Course from off the Columbia Yacht Club station, foot 89th street to and around stake boat 1 500 feet south of Poughkeepsie bridge, 118.6 nautical miles or 136.6 statute miles.

Boat.	Owner.	Rating.	Start		Finish.		Elapsed time.
			H. M. S.	H. M. S.	H. M. S.	H. M. S.	
XPDNC	Frank Croker	79 7	12 05 20	5 16 50	5 11 30		
Vingt Et Un II.	W. S. Kilmer	79 35	12 16 25	6 15 00	6 01 00		
Challenger	A. D. P. Smith	88 35	12 07 20	Disabled			

## Up Leg

Boat.	Finish at Poughkeepsie.	Elapsed time.
	H. M. S.	H. M. S.
XPDNC	2 35 50	2 30 50
Vingt Et Un II.	3 24 30	3 19 30

## Down Leg.

Boat.	From Poughkeepsie.	Finish.	Elapsed time.
	H. M. S.	H. M. S.	H. M. S.
XPDNC	2 35 50	5 16 50	2 41 00
Vingt Et Un II.	3 24 30	6 15 00	2 50 30

Average speed for entire course (118 6 knots or 136 6 statute miles).

Boat.	Knots.	Statute miles.
XPDNC	22 86	26 29
Vingt Et Un II.	19 26	22 15

Boat.	Motor.	H. P.	Revolutions per minute	L. W. L.
XPDNC	Mercedes	47 6	850	44 feet.
Vingt Et Un II.	S. & M. Simplex	59 72	800	38 feet.

## TWIN-SCREW GASOLINE YACHT NANCY ANN

The twin-screw gasoline yacht Nancy Ann, built by the Gas Engine & Power Co. and Charles L. Seabury & Co. at Morris Heights, for Col. W. L. Moody of Galveston, Tex., recently developed remarkable speed for a boat of her class. On a trial run from City Island bridge to Morris Heights she covered the distance of 19 miles in 1 hour and 4 minutes, having the benefit of fair tide over the greater portion of the route.

Her length over all is 65 ft., her beam 11 ft. and draught 2 ft. 6 in. The construction is very substantial, adapting her for use in the gulf, where Col. Moody expects to put her in service. As she will be used to a great extent for day trips, with only occasional cruises, a liberal allowance of after deck space has been given, with protection of a high brass and teak combination rail. The divisions of the cabin give the owner a large saloon, hanging lockers, toilet and galley, forward of which the motor room and pilot house are located. Her interior finish is of butternut, and the exterior of mahogany.

She is equipped with two Speedway motors of 48 H. P. each, and it is expected that she will be fleet enough to leave all the pleasure craft of Galveston harbor, for which Col. Moody was intent when ordering her to be built.

## PERSONAL

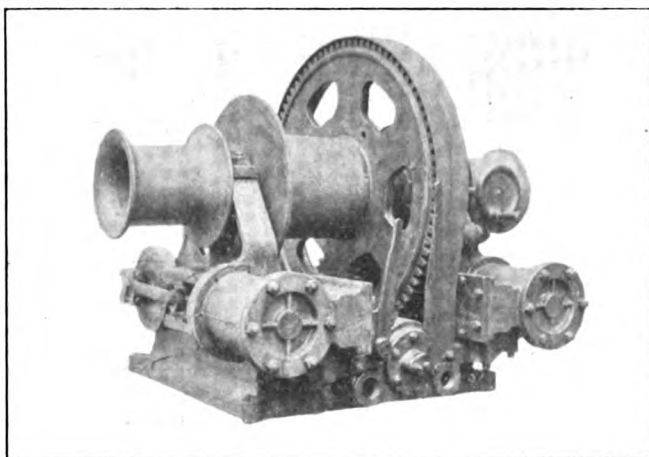
Mr. E. S. Clark, president of the International Harvester Co., has been elected president of the Lackawanna Steel Co. Mr. Clark is a practical steel man. He was at one time manager of the Illinois Steel Co.

Mr. O. T. Warren, formerly general superintendent of the Buffalo Dry Dock Co., has been invited by the Panama Canal Commission to take charge of the floating equipment in connection with the construction of the canal. Mr. Warren was formerly the superintendent of the Bay City yard of the American Ship Building Co. and prior to that had served in the drawing office at Chicago. Mr. Warren has not as yet accepted the offer of the canal commission.

W. A. Boole & Sons, Oakland, Cal., are building a new schooner for the South sea trade.

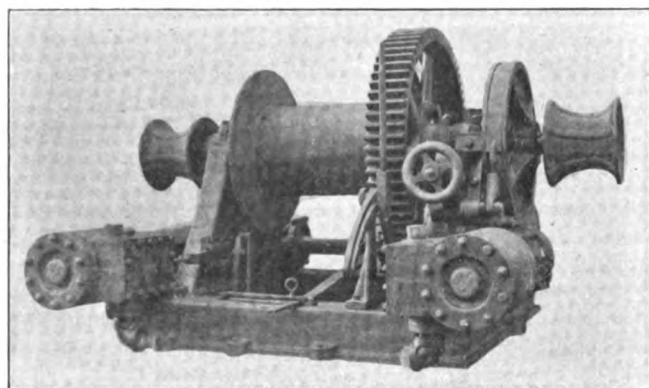
### GLOBE CAPSTANS AND WINDLASSES

The accompanying photographs give very graphic illustrations of the auxiliary equipment on board ship made by the American Ship Building Co. of Cleveland. The 8 by 10



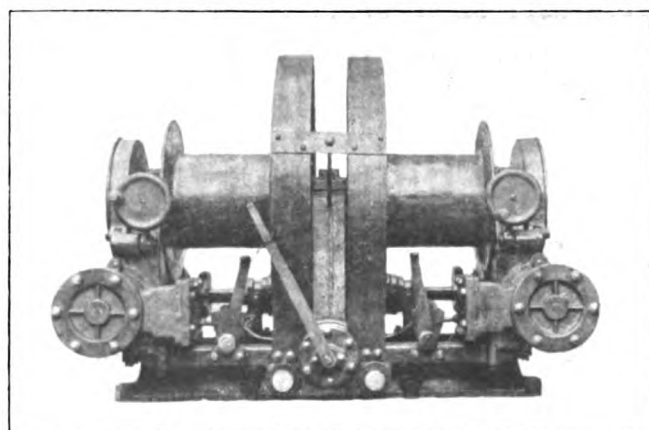
8 X 8 IN. DECK ENGINE.

single drum deck engine is of very heavy construction and is built for handling wire lines up to  $1\frac{1}{8}$  in. diameter. It has two cylinders 8 in. by 10 in. stroke, is reversed by link



8 X 10 IN. CLEVELAND PATENT DECK ENGINE.

motion and is fitted with a powerful band brake operated by hand wheel and screw which holds the line when the ship is moored.



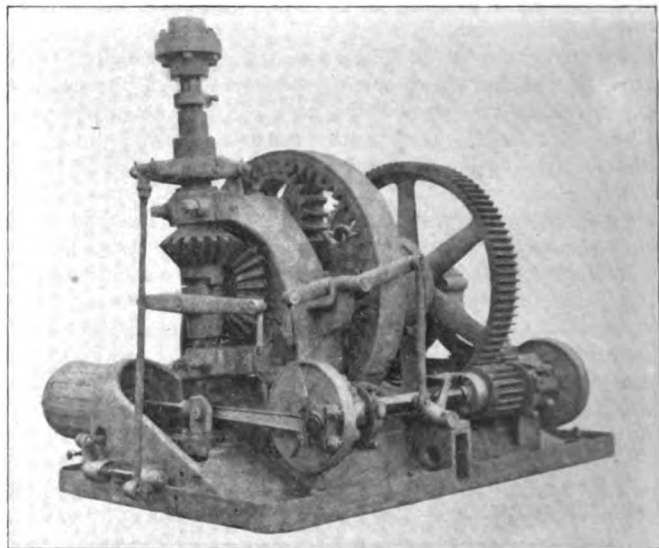
8 X 8 IN. DOUBLE DRUM DECK ENGINE.

The 8 by 8 single drum deck engine is similar to the 8 by 10, but is lighter in construction. It has two cylinders 8 in.

diameter by 8 in. stroke and is reversed by reverse valve and lever.

The 8 by 8 double drum deck engine is fitted with two drums, either of which may be operated separately while the other is held by brake.

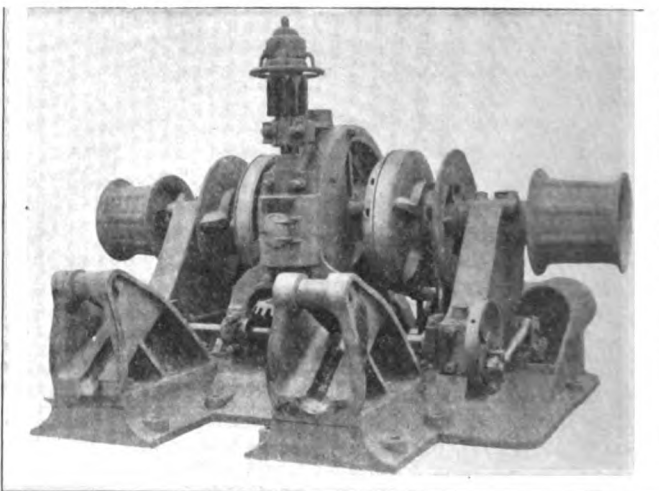
The Globe steering engine is made in three sizes, 8 by 8, 7 by 6 in. and 4 by 6 in. It is a very powerful, smooth running and reliable steering engine and may be used with various arrangements such as the engine, hand and steam gear all forward, the engine and hand gear aft and the steam



8 X 8 IN GLOBE STEERER.

operating gear only forward, or the engine aft with both the hand and steam gear forward in the pilot house.

The Globe windlass is made in three sizes, 12 by 12 in., 10 by 10 in. and 8 by 8 in. The engines are horizontal, bolted to main frames, thus making the whole machine self-contained



10 X 10 IN. GLOBE CAPSTAN WINDLASS

on one bedplate. The main shaft carrying wildcats is operated from crank shaft through bevel and worm gearing. It is fitted with overhead capstan and powerful brake and may be operated from spar or forecastle deck.

The Brooklyn navy yard and the Mare Island navy yard have each been given orders to build a collier authorized by congress at its last session. These colliers will be the largest and fastest in the world and \$1,250,000 was appropriated for the construction of each.



**AMERICAN SHIP WINDLASS CO'S. PRODUCTS**

The American Ship Windlass Co. of Providence, R. I., were the pioneers in the windlass business and have made a number of improvements in this line of business. The latest thing in a ship windlass which they have brought out is a yielding windlass, of which they build two distinct types. One is the "Providence" patent automatic steam windlass, which relieves the strains on the chain cables by the steam pressure in the cylinders, and which works on the same principle as the Shaw and Spiegle patent automatic steam towing machine, of which such a large number are in use on the lakes, on the Atlantic and Pacific coasts, in Canada and abroad, and which have proved thoroughly reliable during a test of a good many years. The automatic steam windlass is an absolute guarantee against parting the chains, the same as the automatic steam towing machine is a guarantee against parting the hawser in towing. In addition to the factor of safety which this automatic steam windlass gives, very much smaller chains and anchors can be used because of the relief from strains on the chains and anchors which the automatic action affords. This saves both in weight and cost of chains and anchors.

As the automatic steam windlass, from the principle of its operation can be used only on steam vessels, the American Ship Windlass Co. brought out a second type of yielding windlass, and this is the "Providence" elastic yielding windlass. Either a hand or a steam windlass can be built with

this arrangement, as the elastic yielding windlass relieves the windlass, chains and anchors from the strains and sudden jerks, which would otherwise come upon them, by means of steel and rubber



springs in the windlass.

Capt. M. W. Blake, who has one of the elastic yielding windlasses on his schooner Perry Setzer says: "I am satisfied there has never been an invention so well adapted to anchoring at sea." On the lakes the American Ship Windlass Co. have furnished one of these elastic yielding windlasses for the new steamer Utica of the Western Transit Co.

While keeping ahead of the times in improvements in windlass construction, the American Ship Windlass Co. are not neglecting new designs in smaller machines which come in their line. The accompanying cut shows a new style of sheet holder for hauling in the main and jib sheets. It is small, as it looks, but its size is no comparison to its power. One man with one of these holders can easily handle the sheet. The holder is provided with a noiseless device for holding the barrel in any position where it may be left. The lever is removable, so that it takes up almost no room at all on a yacht. It is made of bronze or galvanized iron and in different sizes. This is only one of the styles of sheet holders made by this company, and yacht windlasses, capstans, mast and centerboard winches and stockless anchors have been one of their specialties for years.

Rear Admiral John G. Walker, chairman of the Isthmian canal commission and three other members of the commission have been made directors of the Panama Railway Co. which was acquired by the government when it bought the strip of land now known as the Panama zone. Later the entire commission will constitute the directory of this railway. It is understood that Mr. Horace See has been selected to design some vessels for the company and has been appointed constructor under the supervision of the railway company.

**FERRALL'S ALL METAL CARGO HOISTER**

Ferrall's all metal cargo hoister, manufactured by the Boston & Lockport Block Co., Boston, Mass., is the latest block on the market for cargo hoisting. As it is constructed wholly of metal it is said to be the most durable block which has been produced. It is circular in form and has large inward and outward swelled edges which prevent the rope from coming in contact with the edge of the sheave. They are also of such shape that they prevent the sheave from touching any part of the shell. The hub of the sheave used in this block, as you will notice by the illustration, has Star Metaline bushing with side bearings. Tests have proven that this sheave will hoist more rapidly without heating than any other sheave yet produced. These blocks are also great savers of rope. Capt. Roberts of the White Star Line in speaking of the Ferrall hoister, said: "I consider it the best block on the market for stevedores' use."

**MARINE SETS.**

The Fisher Electrical Works, Detroit, Mich., have recently brought out a new type of direct-connected marine sets. This machine represents the very latest improvements in engineering practice. The sets are equipped with Rites automatic governor. The crank and armature shaft is in one piece. The armature and commutator hub is carried on a spider and is secured to the shaft by clamp screws and a key. The main bearings are conical in shape and are adjusted to the shaft by taper nuts inside and out, making it absolutely impossible to throw the main shaft out of line. The engine is of the vertical enclosed type and all parts are self-oiling. The dynamos are multipolar, not less than eight poles. The commutators are drawn from solid bar and thoroughly insulated with mica. Radial carbon brushes are used, and the machines work from full to no load in either direction without sparking or adjustment at the brushes.

**LAUNCH OF FERRY BOAT GOSHEN**

The ferry boat Goshen, built at the yard of the Harlan & Hollingsworth Co., Wilmington, Del., for the Erie Railroad Co., was launched last Saturday and named by Miss Maude Underhill of Goshen, N. Y. The Goshen is a duplicate of the double screw steel ferryboat Tuxedo, built by this company for the Erie railroad and of the following dimensions: Length over guards, 224 ft.; length between stem posts, 219 ft. 6 in.; length between propeller posts, 192 ft.; breadth of hull molded at deck, 43 ft. 6 in.; breadth over guards, 64 ft.; depth, amidships, 17 ft. 9 in.

The interior finish of the boat is of oak. It is fitted with two compound engines coupled together and working on the same shaft, and two Scotch return-tube boilers, one combined air pump and jet condenser, one feed water heater and complete outfit of independent pumps.



## ITEMS OF GENERAL INTEREST

The five-masted schooner Marcus L. Urran of Boston was launched last week from the yard of Charles B. Minott, Jr., Phippsburg, Me.

The Bucyrus Co., South Milwaukee, Wis., has been awarded the contract for furnishing eleven steam shovels to the Panama Canal Commission for an aggregate sum of \$117,250.

The tug P. McCabe, Jr., of the Albany Towing Co.'s fleet, which recently had her joiner work destroyed by fire at Watervleit, is rapidly nearing completion at the Rensselaer wharf of the company.

Lorillard & Walker, 41 Wall street, New York, announce that they have purchased the good will and entire records of Frank N. Tandy, yacht broker of New York and Boston, and will continue his business under their name.

The Arbuckle Towing Line in opposition to the Cornell Line on the Hudson river, have come to an agreement whereby rates have been restored to \$28. Boats were towed to New York for \$2 and \$5 during rate war.

The transport Buffalo will be repaired at the Mare Island navy yard. Repairs to be made on her machinery by the steam engineering department will amount to about \$100,000 and by the construction department to probably an equivalent sum.

The Hudson river dry dock, formerly owned by Paul Le Roux, has been taken to Jersey City by John Swenson, the present owner, leaving Albany without a dry dock except the canal docks, which are only available for canal boats and small tugs.

Fire which broke out recently in the pattern shop and foundry at the Neafe & Levy ship yard, Philadelphia, destroyed a number of patterns and plans for the United States cruiser St. Louis now on the ways at the company's yard. Their loss will probably delay the launching date of the cruiser.

Rear Admiral H. M. Manney, chief of the bureau of equipment of the navy department, has made public his annual report to the secretary of the navy. At the League Island navy yard the expenditures for the past year were \$239,000. Twenty-one ships were repaired there, ranging from the battleship Maine to the tug Modoc.

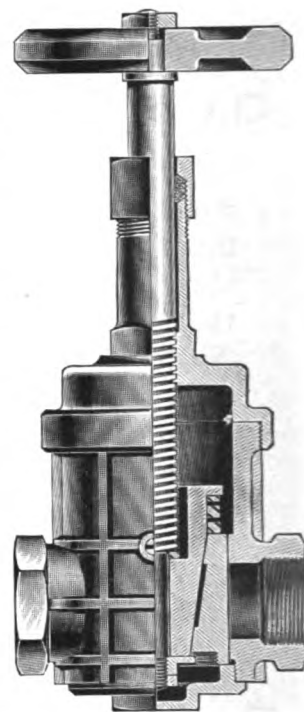
It is announced that the submarine torpedo boat Captain Lake X, which was launched last week at the yard of the Newport News Ship Building & Dry Dock Co., Newport News, Va., will be entered by the Lake company in the government competitive test of submarine boats which is to take place within the next few months.

The Harlan & Hollingsworth plant of the United States Ship Building Co. was sold last week under order of the court authorities. Mr. George R. Sheldon of New York representing the reorganization committee of the ship building company was the purchaser. Mr. Charles M. Schwab who was present said that it was the purpose to continue to operate the plant.

It is understood that Secretary Morton of the navy department is paying serious attention to the navy dry dock equipment. He is considering recommending to congress the construction of a dock at the Pensacola navy yard and also one at the Bremerton navy yard. The navy department holds that there is need of additional dry dock facilities in the south notwithstanding that the Algiers dry dock at New Orleans is rarely used. The dry dock at Charleston, S. C., which has been under way for several years is to be complete two years hence. The new dock at the Boston navy yard is to be completed next month. Colman Bros. of Boston have just been awarded contract for the construction of new approaches to this dock. Bids were opened last week at the navy department for the completion of a dry dock at the Mare Island navy yard, the contract with the Atlantic, Pacific & Gulf Co. having been cancelled.

## ASHTON IMPROVED BLOW OFF VALVE

The Ashton improved blow off valve, as shown in the accompanying cut, is made with the interior working parts of standard high grade composition steam metal, and is particularly designed with a view to tightness, durability and economy of space. It is made in the form of a split piston or plug, nicely fitted to a cylindrical chamber in the body of the valve. When the piston is screwed down to close the valve, the interior wedge, as fitted to the spindle, is brought in contact with a spiral spring, pressing the piston to the bottom, immediately after which the wedge expands the split piston to fit the cylinder absolutely tight. The virtue of this spring is to prevent the wedge from expanding the piston before it has fully bottomed. In opening the valve the first movement of the spindle releases the expanding force of the wedge on the piston, and afterwards raises it so as to give a full straightway opening. This valve does not depend on the pressure of the boiler to make it tight, has a full area of opening and is not materially affected by sediment same as most other blow-off valves. It is made of composition in sizes up to and including the 2-in. pattern, and in larger sizes with iron body, either flanged or screwed. The valve is manufactured by the Ashton Valve Co., Boston, Mass.



## OBITUARY

Capt. Magnussen of the Standard Oil Co.'s steamer Imperial died at the hospital at Sarnia last week.

Collin Lawson, keeper of the Middle Island lighthouse, Lake Erie, was found dead in bed last week. There had been no light in the lighthouse for two days and it was then determined to investigate. Two men rode over the Pelee island and found Lawson dead.

Cornelius Shields, general manager of the Lake Superior Corporation, died very suddenly last week at Sault Ste. Marie, from heart disease. Mr. Shields had been ill with tonsillitis for two days, but his death was entirely unexpected. Shortly before the collapse of the Consolidated Lake Superior Co. Mr. Shields was made its general manager by the directors who felt that Mr. Clergue's abilities were greater as an organizer than as a manager. Prior to that time Mr. Shields had been general manager of the Dominion Iron & Steel Co., Sydney, C. B.

The Fort Wayne Electric Works, Fort Wayne, Ind., has just issued Bulletin No. 1059 devoted to commutator truing devices. It can be had for the asking.

SEALED PROPOSALS will be received at the office of the Light-House Engineer, Buffalo, N. Y., until 11 o'clock A. M. December 1, 1904, and then opened, for building a pile and timber bulkhead and for excavating slip, etc., at the Buffalo Light-House Depot, N. Y., in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Lieut. Col. H. M. Adams, Corps of Engineers, U. S. A., Engineer.

Nov. 17





VOL. XXX.

CLEVELAND, O., NOVEMBER 3, 1904.

No. 18.

# Winter Moorings?

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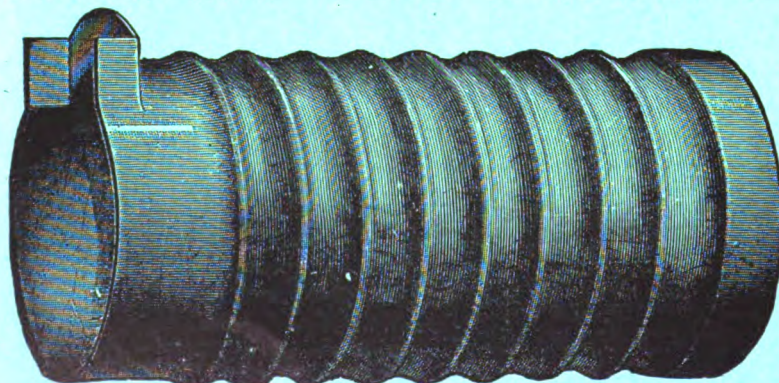
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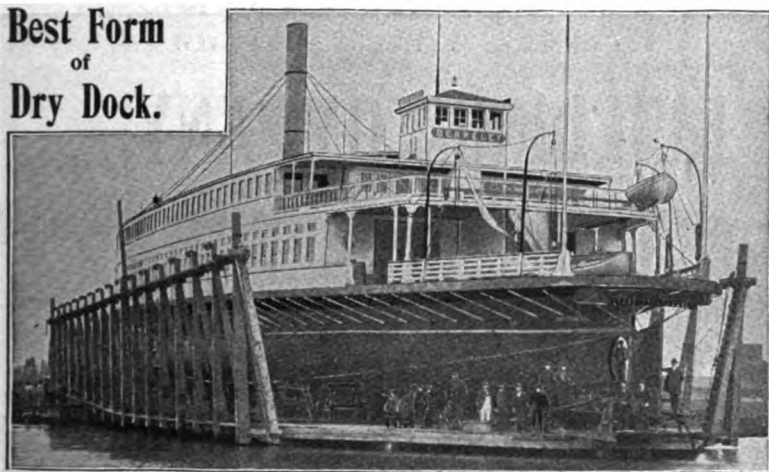
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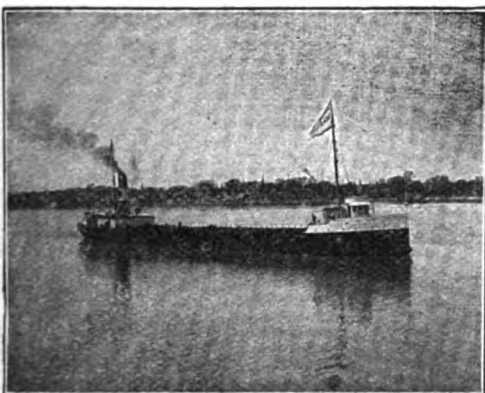
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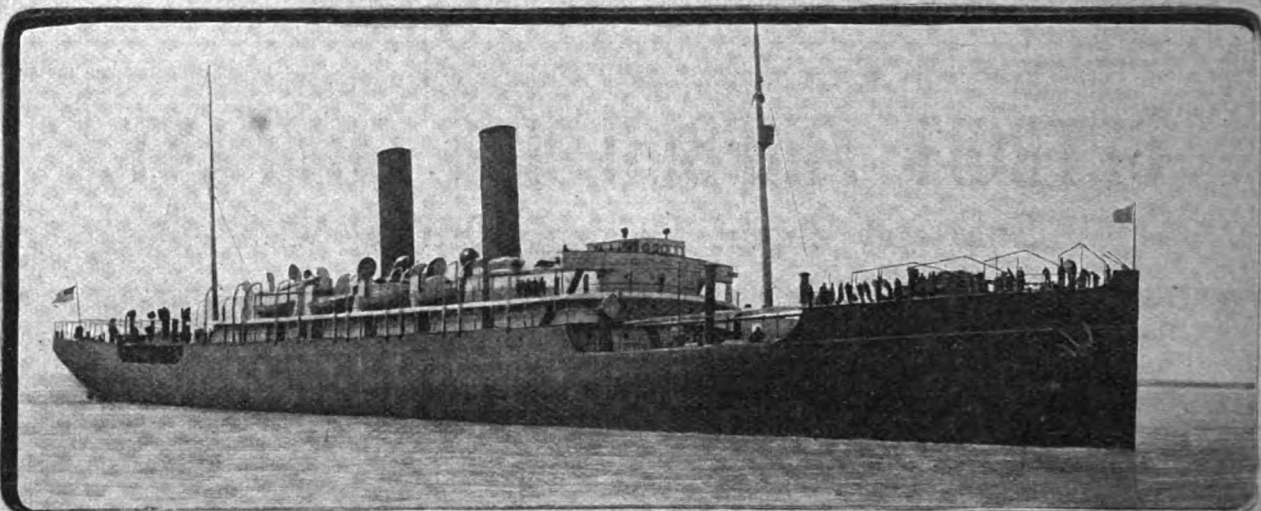
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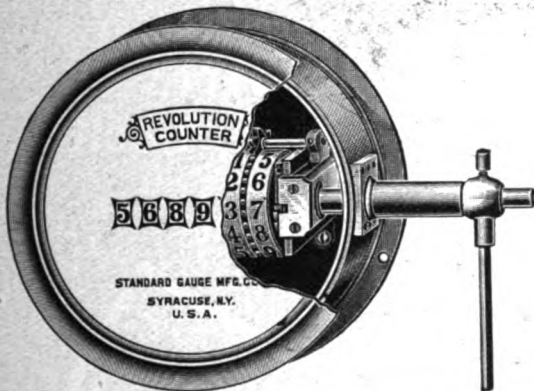
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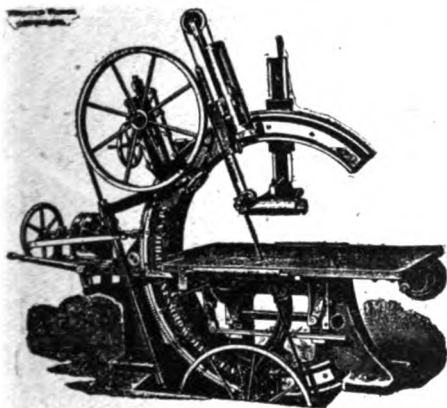
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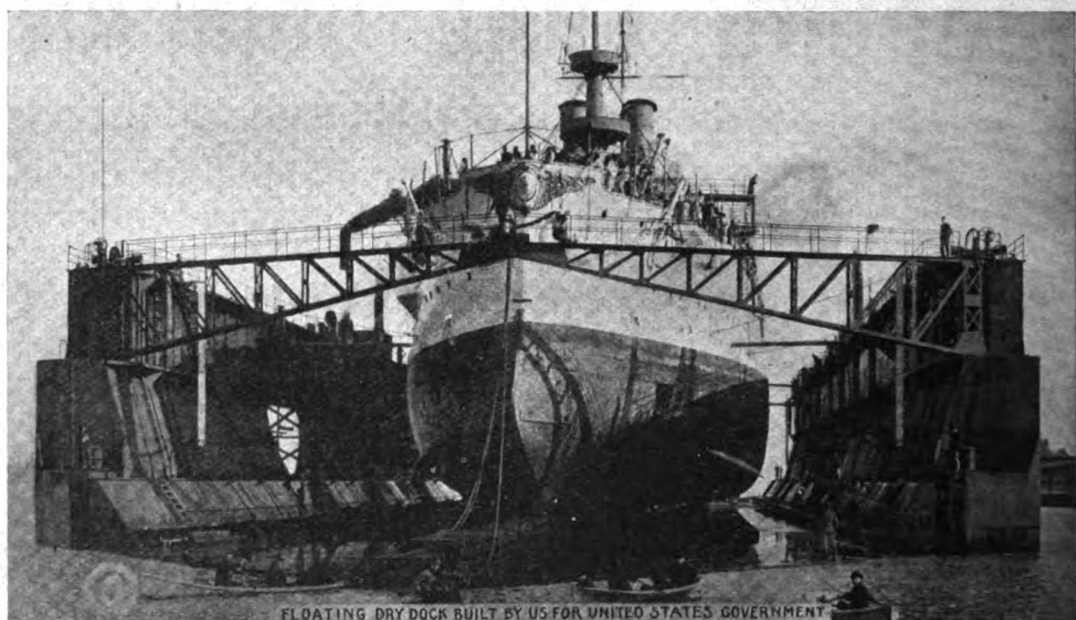
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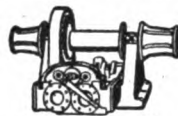
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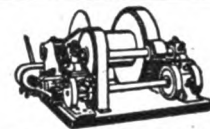
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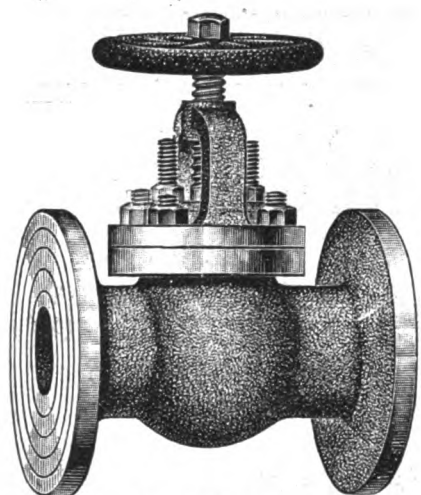
**ENGINE AND BOILER  
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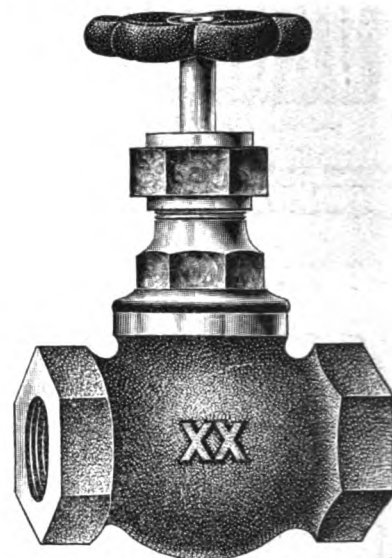
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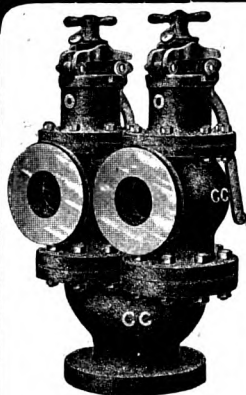
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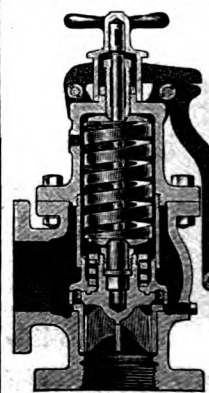
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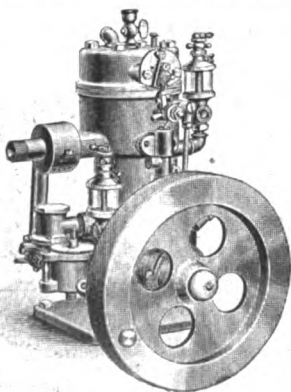
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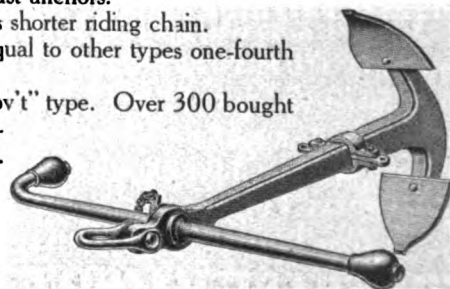
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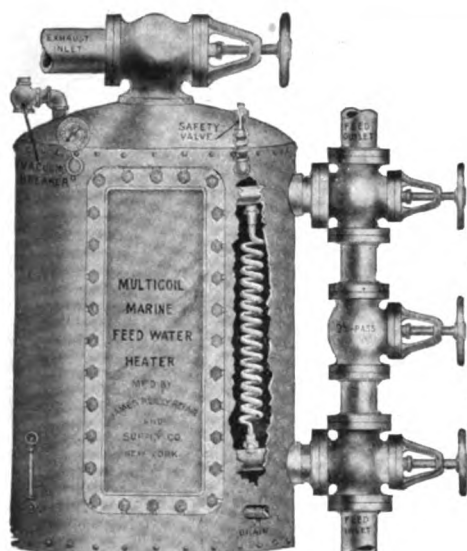
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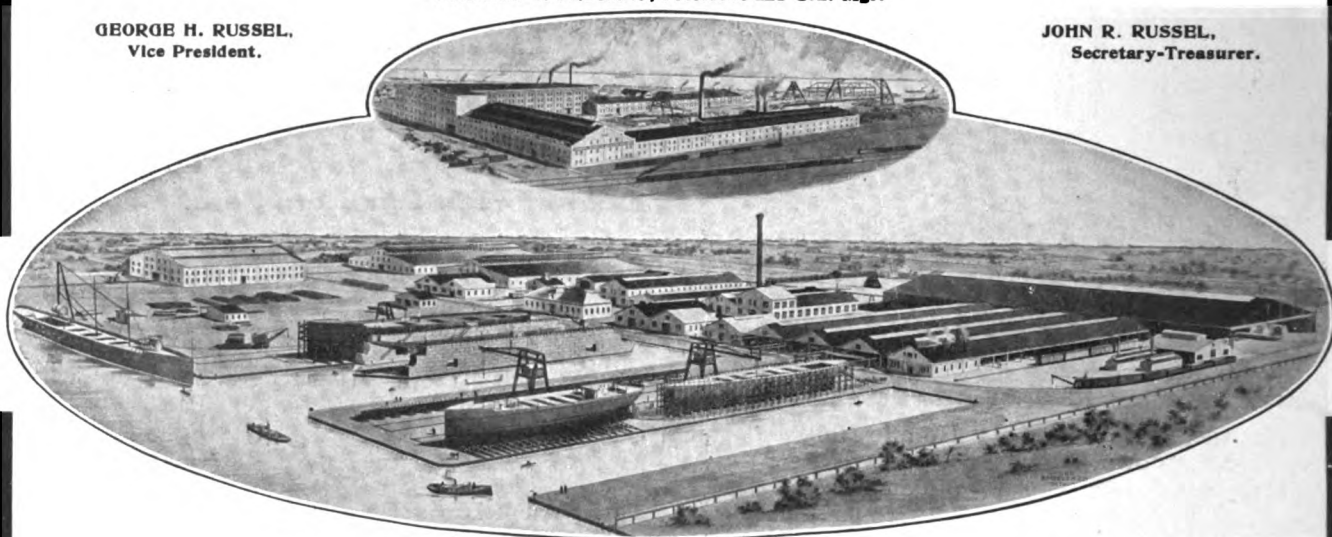
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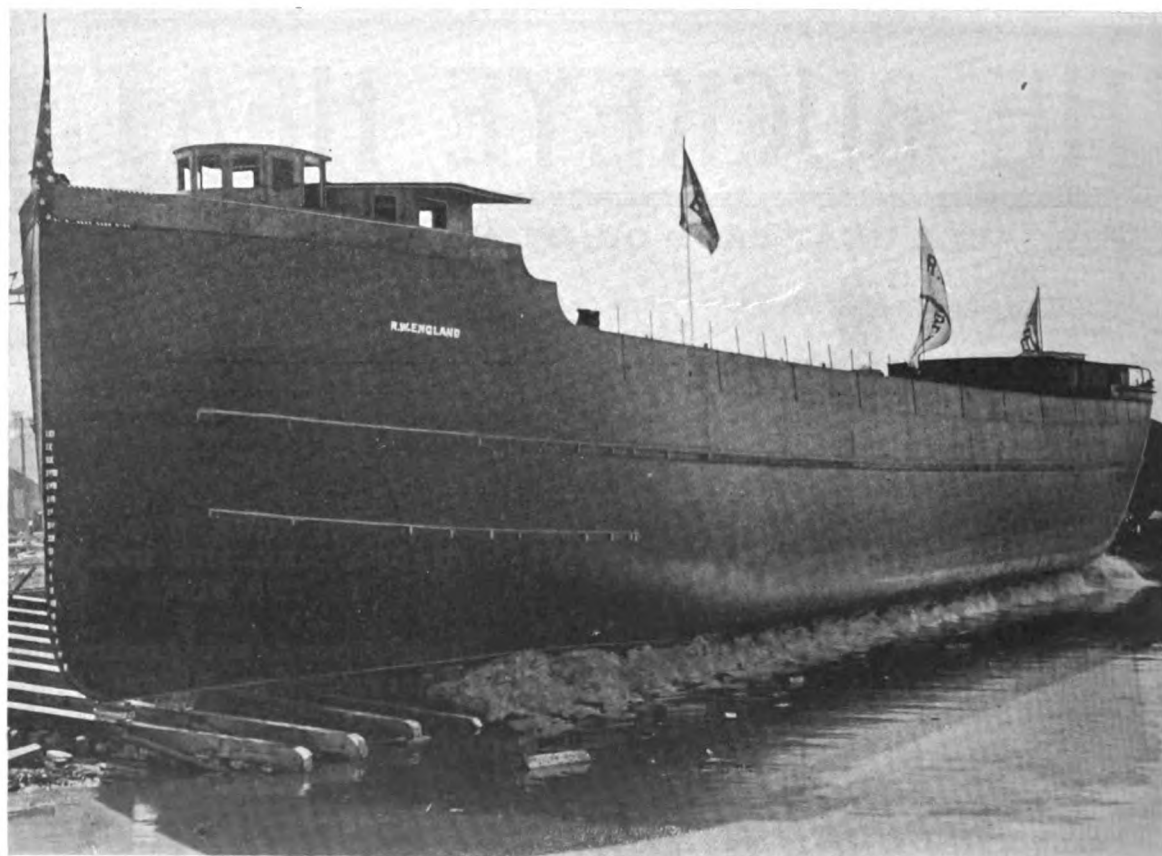
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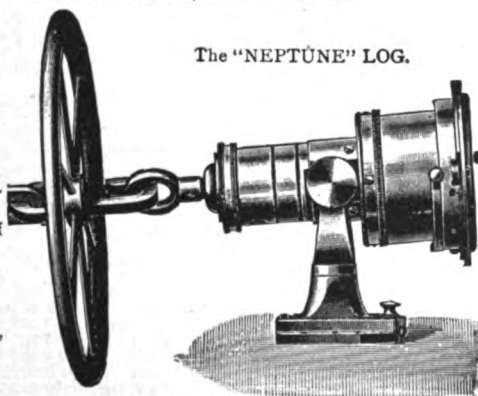
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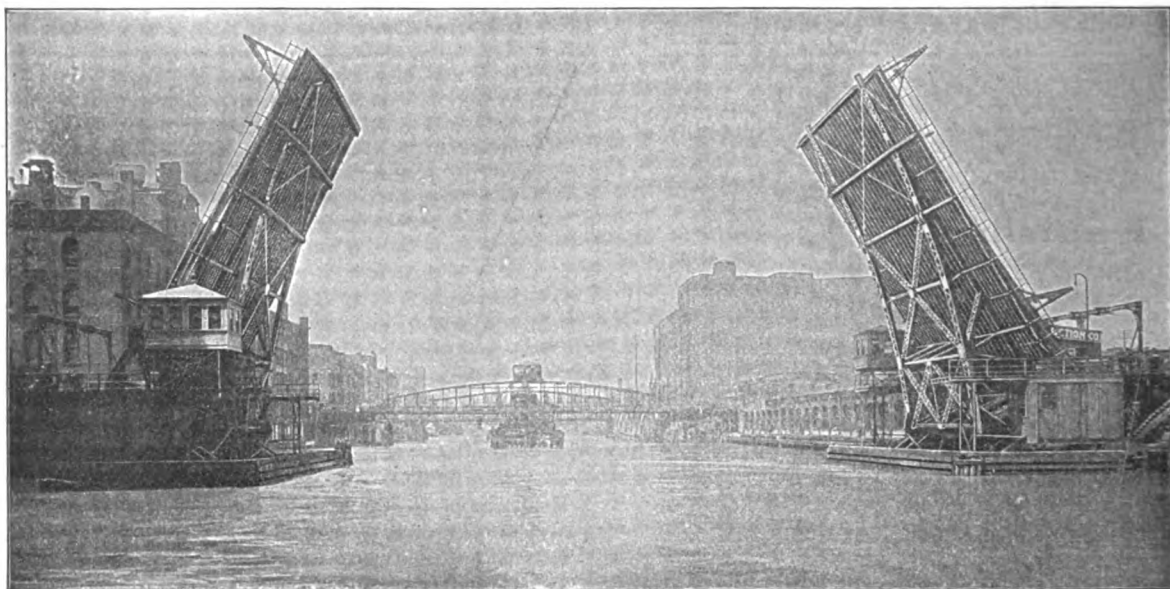


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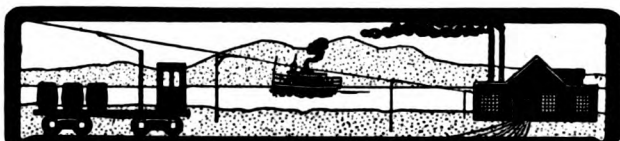
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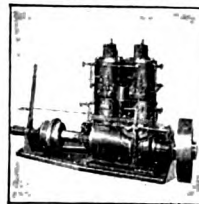
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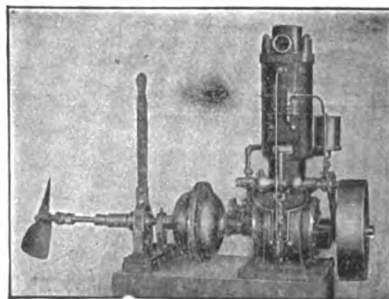
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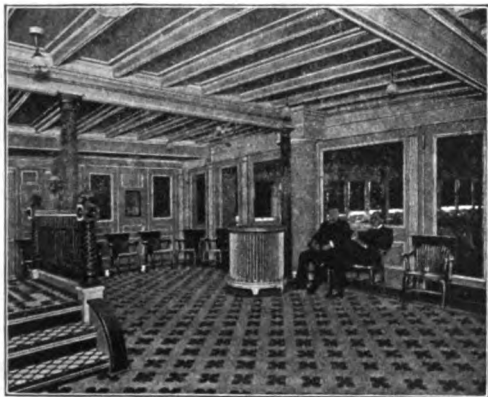
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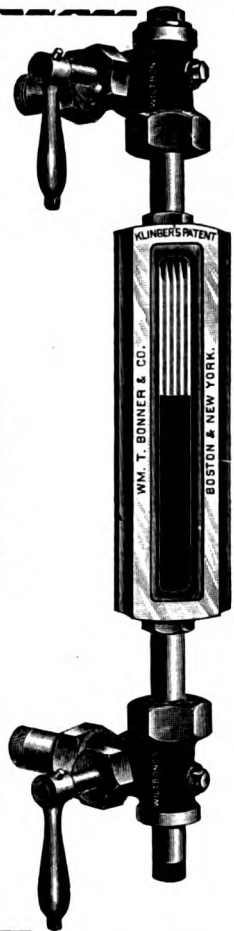
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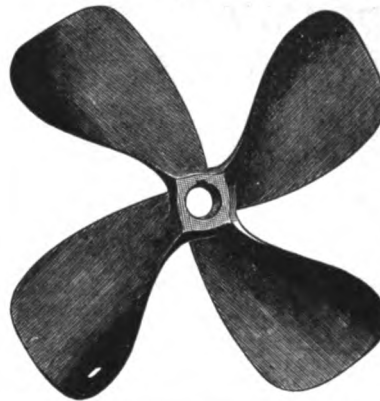
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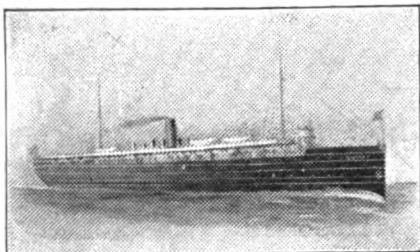
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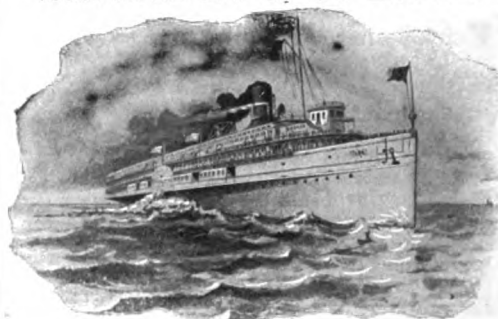
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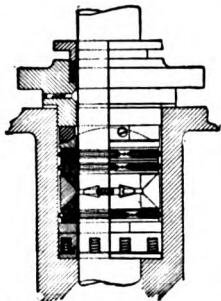
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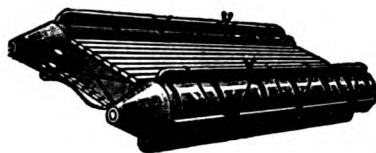
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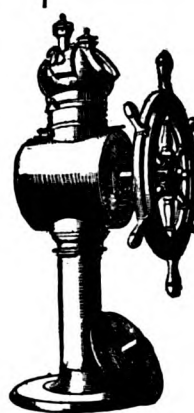
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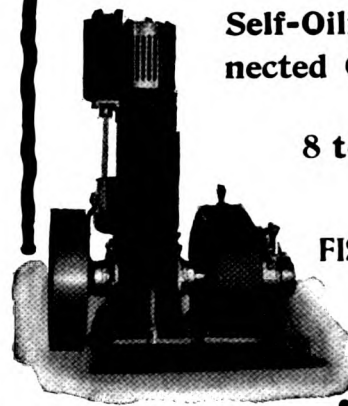


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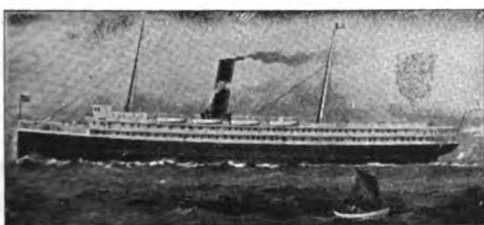
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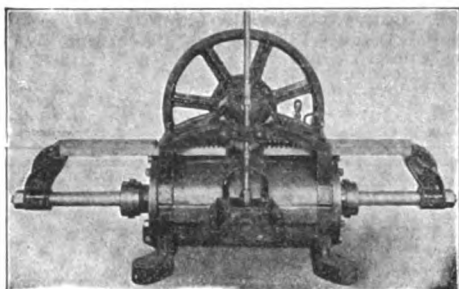
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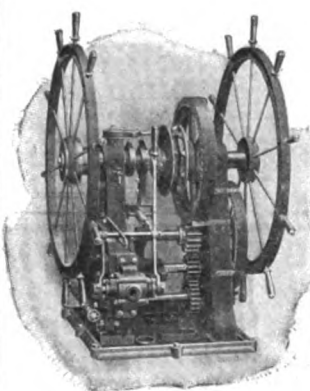
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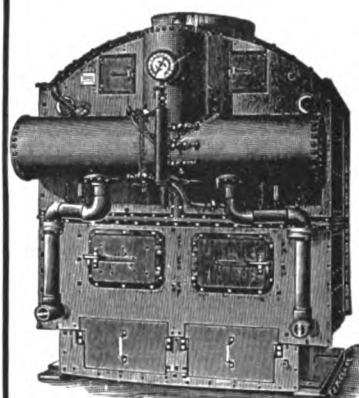
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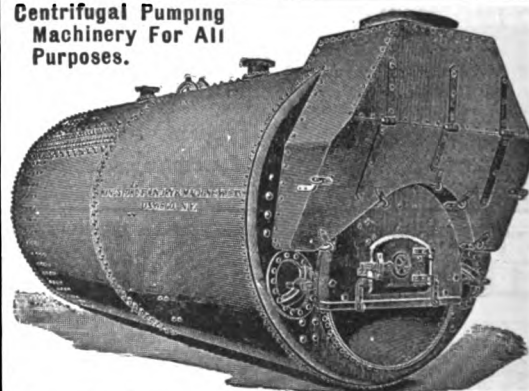
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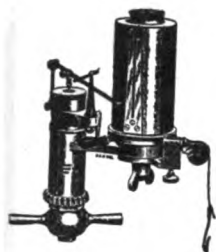
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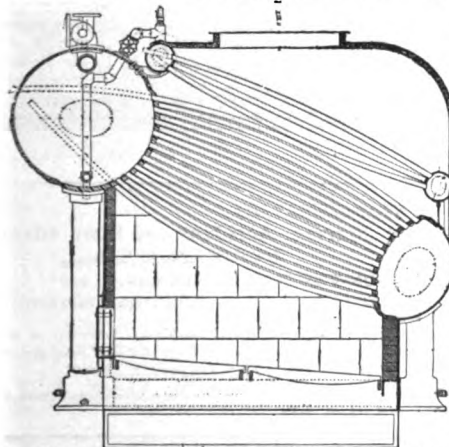
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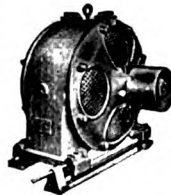
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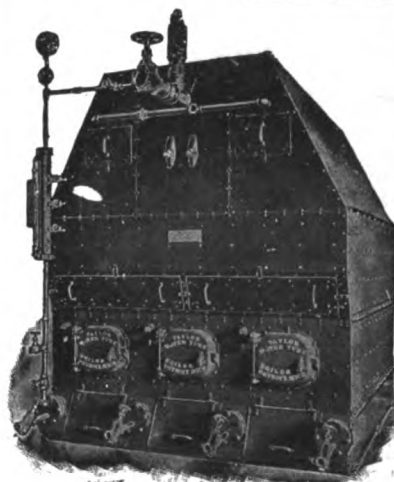
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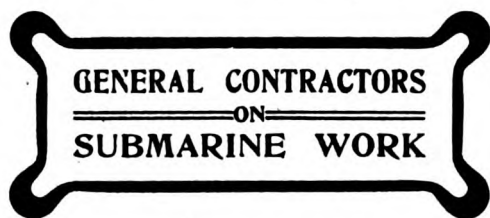
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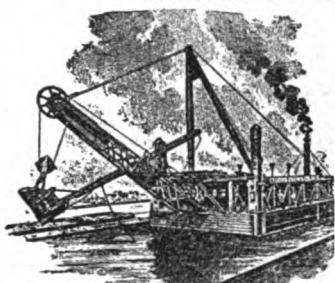
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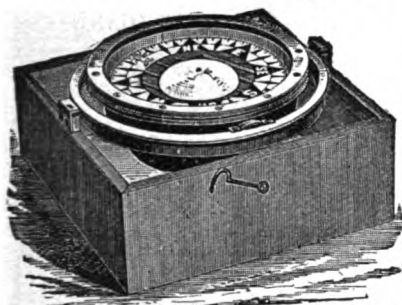
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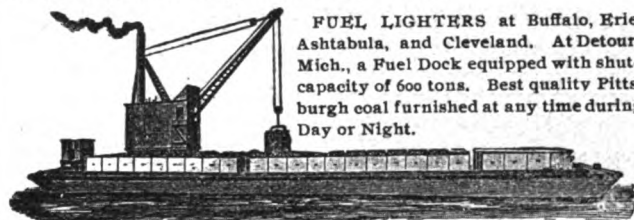
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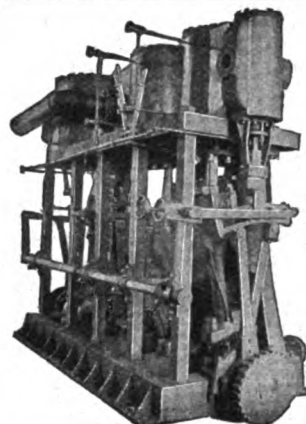
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 Office, 1008 Chamber of Commerce,  
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 235 Water Street, PITTSBURG.  
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 New York City, 60 New Street,  
 Richmond, Va., 1107½ Main Street.

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*Bureau of Inspection.*  
*Tests and Consultation.*  
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 NEW YORK. DETROIT.



# Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review, 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

## AIR COMPRESSORS, AIR HOISTS, ETC.

Dake Engine Co. .... Grand Haven, Mich.  
Great Lakes Engineering Works. .... Detroit.  
Mietz, Aug. .... New York.

## AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co. .... New York.

## AIR PUMPS' AND APPLIANCES.

Fore River Ship & Engine Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit.

## ANCHORS.

Baldt Anchor Co. .... Chester, Pa.  
Bowers, L. M. & Co. .... Binghamton, N. Y.  
DeGrauw, Aymar & Co. .... New York.  
Seaboard Steel Casting Co. .... Chester, Pa.

## ANTI-FOULING AND ANTI-CORROSIVE COMPOSITION FOR STEEL VESSELS.

Holzapfel's American Composition Co. .... New York.

## ANTI-FRICTION METALS.

Cramp, Wm. & Sons. .... Philadelphia.  
Phosphor Bronze Smelting Co., Ltd. .... Philadelphia.  
Victor Metals Co. .... Braintree, Mass.

## ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co. .... Cleveland.  
Detroit Ship Building Co. .... Detroit.  
Great Lakes Engineering Works. .... Detroit.  
Sturtevant, B. F., Co. .... Hyde Park, Mass.

## ASH EJECTORS.

Great Lakes Engineering Works. .... Detroit.

## ATTORNEYS AND PROCTORS IN ADMIRALTY.

Gilchrist, Albert J. .... Cleveland.  
Goulder, Holding & Masten. .... Cleveland.  
Hoyt, Dustin & Kelley. .... Cleveland.  
Kremer, C. E. .... Chicago.  
MacDonald, Ray G. .... Chicago.  
Potter & Potter. .... Buffalo.  
Shaw, Warren, Cady & Oakes. .... Detroit.  
White, Johnson, McCaslin & Cannon. .... Cleveland.

## BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons. .... Brookline, Mass.

## BELTING, RUBBER.

New York Belting & Packing Co. .... New York.

## BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co. .... Boston, Mass.  
Cleveland Block Co. .... Cleveland.

## BLOWERS.

Sturtevant, B. F. Co. .... Hyde Park, Mass.

## BOAT BUILDERS.

Dren, Thos. & Son. .... Wilmington, Del.  
Kahnweiler's Sons, David. .... New York.  
Lane & DeGroot. .... Long Island City, N. Y.  
Marine Construction & D. D. Co. ....  
..... Mariner's Harbor, S. I., N. Y.  
Truscott Boat Mfg. Co. .... St. Joseph, Mich.  
Willard, Chas. P. & Co. .... Chicago.

## BOILER COMPOUNDS.

Dearborn Drug & Chemical Works. .... Chicago.

## BOILER MANUFACTURERS.

Almy Water Tube Boiler Co. .... Providence, R. I.  
American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Babcock & Wilcox Co. .... New York.  
Bertram Engine Works Co., Ltd. ....  
..... Toronto, Can.  
Chicago Ship Building Co. .... Chicago.  
Cramp, Wm. & Sons. .... Philadelphia.  
Delauney, Belleville & Co. .... St. Denis, France.  
Detroit Ship Building Co. .... Detroit.  
Fletcher, W. A. & Co. .... Hoboken, N. J.  
Fore River Shipbuilding Co. .... Quincy, Mass.  
Georgian Bay Engineering Works. ....  
..... Midland, Ont.  
Great Lakes Engineering Works. .... Detroit.

## BOILER MANUFACTURERS—Continued.

Jenks Ship Building Co. .... Port Huron, Mich.  
Kingsford Foundry & Machine Works. ....  
..... Oswego, N. Y.  
Maryland Steel Co. .... Sparrows Point, Md.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Mosher Water Tube Boiler Co. .... New York.  
Newport News Ship Building Co. ....  
..... Newport News, Va.  
Northwestern Steam Boiler & Mfg. Co. ....  
..... Duluth, Minn.  
Roberts Safety Water Tube Boiler Co. ....  
..... New York.  
Stirling, The Co. .... Chicago.  
Superior Ship Building Co. .... Superior, Wis.  
Taylor Water Tube Boiler Co. .... Detroit.  
Union Machine & Boiler Co. .... Cleveland.  
United States Ship Building Co. .... New York.  
Willard, Chas. P. & Co. .... Chicago.

## BOILER RIVETS.

Bourne-Fuller Co. .... Cleveland.

## BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co. .... Cuyahoga Falls, O.

## BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons. .... Philadelphia.  
Fore River Ship & Engine Co. .... Quincy, Mass.  
Great Lakes Engineering Works. .... Detroit.  
Lunkenheimer Co. .... Cincinnati.  
Macbeth Iron Co. .... Cleveland.  
Phosphor Bronze Smelting Co. .... Philadelphia.  
Victor Metals Co. .... Braintree, Mass.

## BRIDGES, BUILDERS OF.

Scherzer Rolling Lift Bridge Co. .... Chicago.

## BUCKETS, ORE AND COAL.

Brown Hoisting & Conveying Machine Co. ....  
..... Cleveland.  
Forest City Boiler Co. .... Cleveland.  
Macbeth Iron Co. .... Cleveland.

## CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co. .... Cleveland.

## CAPSTANS.

American Ship Windlass Co. .... Providence, R. I.  
Hyde Windlass Co. .... Bath, Me.  
Marine Mfg. & Supply Co. .... New York.

## CEMENT, IRON FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .... Jersey City, N. J.

## CHAINS.

Lebanon Chain Works. .... Lebanon, Pa.

## CHAIN HOISTS.

Boston & Lockport Block Co. .... Boston, Mass.  
Dake Engine Co. .... Grand Haven, Mich.

## CHARTS.

Penton Publishing Co. .... Cleveland.  
Potter, J. D. .... London.

## CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

Ashton Valve Co. .... Boston.  
Ritchie, E. S. & Sons. .... Brookline, Mass.  
Standard Gauge Mfg. Co. .... Syracuse, N. Y.

## COAL PRODUCERS AND SHIPPERS.

Hanna, M. A. & Co. .... Cleveland.  
Pickands, Mather & Co. .... Cleveland.  
Pittsburg Coal Co. .... Cleveland.

## COAL AND ORE HANDLING MACHINERY.

Brown Hoisting Machinery Co. (Inc.) ....  
..... Cleveland.  
Macbeth Iron Co. .... Cleveland.

## COMPASSES.

Ritchie, E. S. & Sons. .... Brookline, Mass.

## COMPOSITIONS FOR SHIP'S BOTTOMS.

Holzapfel's American Compositions Co. .... New York.

## CONCRETE MIXERS.

Contractors Supply & Equipment Co. .... Chicago.

## CONDENSORS.

Great Lakes Engineering Works. .... Detroit.  
Thropp & Sons Co., John E. .... Trenton, N. J.

## CONTRACTORS SUPPLIES.

Contractors Supply & Equipment Co., Chicago.

## CONTRACTORS FOR PUBLIC WORKS.

Buffalo Dredging Co. .... Buffalo.  
Chicago & Gt. Lakes Dredge & Dock Co. ....  
..... Chicago.  
Dunbar & Sullivan Dredging Co. .... Buffalo.  
Fitz-Simons & Connell Co. .... Chicago.  
Hickler Bros. .... Sault Ste. Marie, Mich.  
Lake Superior Contracting & Dredging Co. ....  
..... Duluth, Minn.  
Smith Co., L. P. & J. A. .... Cleveland.  
Starke Dredge & Dock Co., C. H. .... Milwaukee.  
Sullivan, M. .... Detroit.

## CORDAGE.

Baker & Co., H. H. .... Buffalo.  
DeGrauw, Aymar & Co. .... New York.  
Upson-Walton Co. .... Cleveland.

## CORK JACKETS AND RINGS.

Armstrong Cork Co. .... Pittsburg, Pa.  
Kahnweiler's Sons, D. .... New York.

## COURSE FINDER.

Field's Patent Course Finder. .... Cleveland.

## CHAIN CONVEYORS, HOISTS.

Brown Hoisting Machinery Co. (Inc.) ....  
..... Cleveland.  
General Electric Co. .... Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co. ....  
..... Pittsburg, Pa.

## CRANES, TRAVELING.

Brown Hoisting Machinery Co. .... Cleveland.  
Pawling & Harnischfeger. .... Milwaukee.

## DIVING APPARATUS.

Morse, A. J. & Son. .... Boston.  
Schrader's Son, A. .... New York.

## DREDGING CONTRACTORS.

Buffalo Dredging Co. .... Buffalo.  
Chicago & Gt. Lakes Dredge & Dock Co. ....  
..... Chicago.  
Dunbar & Sullivan Dredging Co. .... Buffalo.  
Fitz-Simons & Connell Co. .... Chicago.  
Hickler Bros. .... Sault Ste. Marie, Mich.  
Lake Superior Contracting & Dredging Co. ....  
..... Duluth, Minn.  
Smith Co., L. P. & J. A. .... Cleveland.  
Starke Dredge & Dock Co., C. H. .... Milwaukee.  
Sullivan, M. .... Detroit.

## DRYING APPARATUS.

Sturtevant, B. F., Co. .... Hyde Park, Mass.

## DRY DOCKS.

American Ship Building Co. .... Cleveland.  
Atlantic Works. .... East Boston, Mass.  
Buffalo Dry Dock Co. .... Buffalo.  
Chicago Ship Building Co. .... Chicago.  
Craig Ship Building Co. .... Toledo, O.  
Cramp, Wm. & Sons. .... Philadelphia.  
Detroit Ship Building Co. .... Detroit.  
Great Lakes Engineering Works. .... Detroit.  
Lockwood Mfg. Co. .... East Boston, Mass.  
Manitowoc Dry Dock Co. .... Manitowoc, Wis.  
Milwaukee Dry Dock Co. .... Milwaukee.  
Newport News Ship Building Co. ....  
..... Newport News, Va.  
Shipowners Dry Dock Co. .... Chicago.  
Superior Ship Building Co. .... Superior, Wis.  
United States Ship Building Co. .... New York.

## Buyers' Directory of the Marine Trade.—Continued.

**ELECTRIC HOISTS AND CRANES.**

Fisher Electrical Works.....Detroit.  
General Electric Co.....Schenectady, N. Y.  
Pawling & Harnischfeger.....Milwaukee.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**ELECTRIC LIGHT AND POWER PLANTS.**

Fisher Electrical Works.....Detroit.  
General Electric Co.....Schenectady, N. Y.  
Mietz, Aug.....New York.  
Sturtevant, B. F. Co.....Hyde Park, Mass.  
Thropp & Sons, John E.....Trenton, N. J.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**ENGINE BUILDERS, MARINE.**

American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Bertram Engine Works Co., Ltd.....Toronto, Can.  
Chicago Ship Building Co.....Chicago.  
Chase Machine Co.....Cleveland.  
Cramp, Wm. & Sons.....Philadelphia.  
Craig Ship Building Co.....Toledo, O.  
Dake Engine Co.....Grand Haven, Mich.  
Detroit Ship Building Co.....Detroit.  
Fletcher, W. & A. Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works Detroit, Mich.  
Hall Bros.....Philadelphia.  
Jenks Ship Building Co.....Port Huron, Mich.  
Lockwood Mfg. Co.....East Boston, Mass.  
Macbeth Iron Co.....Cleveland.  
Maryland Steel Co.....Sparrows Point Md.  
Mietz, Aug.....New York.  
Milwaukee Dry Dock Co.....Milwaukee.  
Mosher, Chas. D.....New York.  
Moulton Steering Engine Co.....New York.  
Newport News Ship Building Co.....Newport News, Va.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.  
Roach's Ship Yard.....Chater, Pa.  
Sheriffs Mfg. Co.....Milwaukee.  
Superior Ship Building Co.....Superior, Wis.  
Thropp, J. E. & Sons Co.....Trenton, N. J.  
Trout, H. G.....Buffalo.  
United States Ship Building Co.....New York.  
Willard, Chas. P. & Co.....Chicago.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**

Cory, Chas. & Son.....New York.  
Marine Mfg. Supply Co.....New York.

**ENGINE TESTING.**

Kreer & Parsons.....Chicago.

**ENGINEERING SPECIALTIES AND SUPPLIES.**

Crane Co.....Chicago.  
Kieley & Mueller.....New York.  
Lunkenheimer Co.....Cincinnati.  
New York Belting & Packing Co.....New York.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**

Hynd, Alexander.....Cleveland.  
Hunt, Robt. W. & Co.....Chicago.  
Kidd, Joseph.....Duluth, Minn.  
Kreer & Parsons.....Chicago.  
Lovejoy, H. O.....Buffalo.  
Mattenon & Drake.....Philadelphia.  
Mosher, Chas. D.....New York.  
Nacey, James.....Cleveland.  
Pittsburg Testing Laboratory, Ltd.....Pittsburg.  
Rice, Henry.....Buffalo.  
Roelker, H. B.....New York.  
Sadler, Perkins & Field.....New York.  
Steel, Adam.....Cleveland.  
Wood, W. J.....Chicago.

**FANS FOR VENTILATION, EXHAUST, ETC.**

Sturtevant, B. F. Co.....Hyde Park, Mass.

**FEED WATER PURIFIERS AND HEATERS.**

Reilly Repair and Supply Co., Jas.....New York.  
Ross Valve Co.....Troy, N. Y.

**FIXTURES FOR LAMPS, OIL OR ELECTRIC.**

General Electric Co.....Schenectady, N. Y.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**FORGES.**

Sturtevant, B. F. Co.....Boston.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**

Cleveland City Forge & Iron Co.....Cleveland.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Macbeth Iron Co.....Cleveland.

**FLUE WELDING.**

Fix's, S. Sons.....Cleveland.

**FUEL ECONOMIZERS.**

Sturtevant Co., B. F.....Hyde Park, Mass.

**FUELING COMPANIES AND COAL DEALERS.**

Hanna, M. A. & Co.....Cleveland.  
Ironville, Dock & Coal Co.....Toledo, O.  
Parker Bros. Co., Ltd.....Detroit.  
Picklands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.  
Smith, Stanley B., & Co.....Detroit.  
Smith Coal & Dock Co., Stanley B. Toledo, O.

**FURNACES FOR BOILERS.**

Continental Iron Works.....New York.

**GASKETS, RUBBER.**

New York Belting & Packing Co.....New York.

**GAS BUOYS.**

Safety Car Heating & Lighting Co.....New York.

**GAS AND GASOLINE ENGINES.**

Chase Machine Co.....Cleveland.  
Georgian Bay Engineering Works.....Midland, Ont.  
Reliance Mfg. Co.....Providence, R. I.

**GAUGES, STEAM AND VACUUM.**

American Steam Gauge & Valve Mfg. Co.....Boston.  
Ashton Valve Co.....Boston.  
Lunkenheimer Co.....Cincinnati.  
Standard Gauge Mfg. Co.....Syracuse, N. Y.

**GAUGES, WATER.**

Bonner & Co., Wm. T.....Boston.  
Lunkenheimer Co.....Cincinnati, O.  
Standard Gauge Mfg. Co.....Syracuse, N. Y.

**GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**HAMMERS, STEAM.**

Chase Machine Co.....Cleveland.

**HEATING APPARATUS.**

Sturtevant, B. F. Co.....Hyde Park, Mass.

**HOISTS FOR CARGO, ETC.**

American Ship Building Co.....Cleveland.  
Brown Hoisting Machinery Co. (Inc.).....Cleveland.  
Chase Machine Co.....Cleveland.  
General Electric Co.....New York.  
Georgian Bay Engineering Works.....Midland, Ont.  
Hyde Windlass Co.....Bath, Me.  
Marine Iron Co.....Bay City.  
Mietz, Aug.....New York.  
Pawling & Harnischfeger.....Milwaukee.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**HOLLOW STAYBOLT IRON.**

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

**HOSE, RUBBER.**

New York Belting & Packing Co.....New York.

**HYDRAULIC DREDGES.**

Great Lakes Engineering Works.....Detroit.

**HYDRAULIC TOOLS.**

Watson-Stillman Co., The.....New York.

**ICE MACHINERY.**

Great Lakes Engineering Works.....Detroit.  
Roelker, H. B.....New York.

**INDICATORS FOR STEAM ENGINES.**

American Steam Gauge Co.....Boston.  
Ashton Valve Co.....Boston.

**INJECTORS.**

American Injector Co.....Detroit.  
Crane Co.....Chicago.  
Jenkins Bros.....New York.  
Lunkenheimer Co.....Cincinnati.  
Penberthy Injector Co.....Detroit, Mich.

**INSURANCE, MARINE.**

Elphicke, C. W. & Co.....Chicago.  
Fleming & Co., P. H.....Chicago.  
Frankfort Marine, A. & P. G. Ins. Co.....New York.

**INSURANCE, MARINE—Continued.**

Gilchrist & Co., C. P.....Cleveland.  
Hawgood & Co., W. A.....Cleveland.  
Helm & Co., D. T.....Duluth.  
Hutchinson & Co.....Cleveland.  
McCarthy, T. R.....Montreal.  
McCurdy, Geo. L.....Chicago.  
Mitchell & Co.....Cleveland.  
Parker Bros. Co., Ltd.....Detroit.  
Peck, Chas. E. & W. F. New York & Chicago.  
Prindiville & Co.....Chicago.  
Richardson, W. C.....Cleveland.  
Sullivan, D. & Co.....Chicago.  
Voss, F. D.....New York.

**IRON ORE AND PIG IRON.**

Bourne-Fuller Co.....Cleveland, O.  
Hanna, M. A. & Co.....Cleveland.  
Pickands, Mather & Co.....Cleveland.

**LAUNCHES—STEAM, NAPHTHA, ELECTRIC.**

Georgian Bay Engineering Works.....Midland, Ont.  
Marine Construction & D. D. Co.....Mariner's Harbor, S. I., N. Y.  
Truscott Boat Mfg. Co.....St. Joseph, Mich.  
Willard, Chas. P.....Chicago.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**

Armstrong, Cork Co.....Pittsburg.  
Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, D.....New York.

**LIGHTS, SIDE AND SIGNAL.**

Russell & Watson.....Buffalo.

**LOGS.**

Walker & Sons, Thomas .... Birmingham, Eng.  
Also Ship Chandlers.

**LUBRICATING GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**LUBRICATORS.**

Crane Co.....Chicago.  
Lunkenheimer Co.....Cincinnati.

**LUMBER.**

Martin-Barriess Co.....Cleveland.

**MACHINISTS.**

Chase Machine Co.....Cleveland.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lockwood Mfg. Co.....East Boston, Mass.  
Macbeth Iron Co.....Cleveland.  
Union Machine & Boiler Co.....Cleveland.

**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc.....Philadelphia.

**MARINE RAILWAYS.**

Hickler Bros.....Sault Ste. Marie, Mich.

**MARINE GLUE.**

Ferdinand & Co., L. W.....Boston, Mass.

**MARINE RAILWAYS, BUILDERS OF.**

Crandall & Son, H. I.....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**

Fogg, M. W.....New York.

**MECHANICAL DRAFT FOR BOILERS.**

American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

**MELTING POT AND PAYING LADLE.**

(For Paying Seams of Decks with Marine Glue.)  
Ferdinand & Co., L. W.....Boston.

**METALLIC PACKING.**

Katzenstein, L. & Co.....New York.

**METAL POLISH.**

Bertram's Oil Polish Co.....Boston.

**MOTORS, GENERATORS—ELECTRIC.**

Fisher Electrical Works.....Detroit.  
General Electric Co.....Schenectady, N. Y.  
Sturtevant, B. F. Co.....Hyde Park, Mass.  
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

## Buyers' Directory of the Marine Trade.—Continued.

**NAUTICAL INSTRUMENTS.**

Ritchie, E. S., &amp; Sons.....Brookline, Mass.

**NAUTICAL SCHOOLS.**

Chicago Nautical School.....Chicago.

**NAVAL ARCHITECTS.**

Hynd, Alexander.....Cleveland.  
 Kidd, Joseph.....Duluth, Minn.  
 Kreer & Parsons.....Chicago.  
 Lovejoy, H. O.....Buffalo.  
 Matteson & Drake.....Philadelphia.  
 Mosher, Chas. D.....New York.  
 Nacey, James.....Cleveland.  
 Rice, Henry.....Buffalo.  
 Sadler, Perkins & Field.....New York.  
 Steel, Adam.....Cleveland.  
 Wood, W. J.....Chicago.

**OAKUM.**

DeGrauw, Aymar & Co.....New York.  
 Stratford, Oakum Co.....Jersey City, N. J.

**OIL ENGINES.**

Mietz, Aug. ....New York.

**OILS AND LUBRICANTS.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.  
 Standard Oil Co.....Cleveland.

**PACKING.**

Crane Co.....Chicago.  
 Jenkins Bros.....New York.  
 Katzenstein, L. & Co.....New York.  
 New York Belting & Packing Co.....New York.

**PACKING TOOL.**

Matteson &amp; Drake.....Philadelphia.

**PAINTS.**

Baker, Howard H. & Co.....Buffalo.  
 Detroit Varnish Co.....Detroit.  
 Detroit White Lead Works.....Detroit.  
 New Jersey Zinc Co.....New York.  
 Upson-Walton Co.....Cleveland.

**PATTERN SHOP MACHINERY.**

Atlantic Works, Inc.....Philadelphia.

**PILE DRIVING AND SUBMARINE WORK.**

Buffalo Dredging Co.....Buffalo.  
 Chicago & Gt. Lakes Dredge & Dock Co.....Chicago.  
 Dunbar & Sullivan Dredging Co.....Buffalo.  
 Fitz-Simons & Connell Co.....Chicago.  
 Hickler Bros.....Sault Ste. Marie, Mich.  
 Lake Superior Contracting & Dredging Co.....Duluth, Minn.  
 Parker Bros. Co., Ltd.....Detroit.  
 Smith Co., L. P. & J. A.....Cleveland.  
 Starke Dredge & Dock Co., C. H.....Milwaukee.  
 Sullivan, M.....Detroit.

**PIPE, WROUGHT IRON.**

Bourne-Fuller Co.....Cleveland, O.  
 Crane Co.....Chicago.  
 Macbeth Iron Co.....Cleveland.

**PLANING MILL MACHINERY.**

Atlantic Works, Inc.....Philadelphia.

**PLATES—SHIP, STRUCTURAL, ETC.**  
 Bourne-Fuller Co.....Cleveland, O.  
 Otis Steel Co.....Cleveland.

**PNEUMATIC TOOLS.**

Allen, John F.....New York.

**POLISH FOR METALS.**

Bertram's Oil Polish Co.....Boston.

**PRESSURE REGULATORS.**

Kieley & Mueller.....New York.  
 Ross Valve Co.....Troy, N. Y.

**PROPELLER WHEELS.**

American Ship Building Co.....Cleveland.  
 Atlantic Works.....East Boston, Mass.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Detroit Ship Building Co.....Detroit.  
 Fore River Shipbuilding Co.....Quincy, Mass.  
 Great Lakes Engineering Works.....Detroit.  
 Hyde Windlass Co.....Bath, Me.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 Macbeth Iron Co.....Cleveland.  
 Milwaukee Dry Dock Co.....Milwaukee.  
 Newport News Ship Building Co.....Newport News, Va.  
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.  
 Roelker, H. B.....New York.  
 Sheriffs Mfg. Co.....Milwaukee.  
 Superior Ship Building Co.....Superior, Wis.  
 Thropp & Sons Co., J. E.....Trenton, N. J.  
 Trout, H. G.....Buffalo.  
 United States Ship Building Co.....New York.

**PROJECTORS, ELECTRIC.**

General Electric Co.....Schenectady, N. Y.  
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**PUMPS FOR VARIOUS PURPOSES.**

Blake, Geo. F., Mfg. Co.....New York.  
 Great Lakes Engineering Works.....Detroit.  
 Kingsford Foundry & Machine Works.....Oswego, N. Y.

**PUNCHES, RIVETERS, SHEARS.**

Allen, John F.....New York.

**RANGES.**

Russell &amp; Watson.....Buffalo

**REFRIGERATING APPARATUS.**

Great Lakes Engineering Works.....Detroit.  
 Roelker, H. B.....New York.

**REGISTER FOR CLASSIFICATION OF VESSELS.**

Great Lakes Register.....Cleveland.  
 Record of American & Foreign Shipping.....New York.

**REPAIRS—ENGINE AND BOILER.**

(See also Boiler Manufacturers and Engine Builders.)

Georgian Bay Engineering Works.....Midland, Ont.

**RIVETING MACHINES.**

Allen, John F.....New York.

**RIVETS, STEEL FOR SHIPS AND BOILERS.**

Bourne-Fuller Co.....Cleveland, O.

**SAFETY VALVES.**

American Steam Gauge & Valve Mfg. Co.....Boston.  
 Ashton Valve Co.....Boston.  
 Crane Co.....Chicago.  
 Lunkenheimer Co.....Cincinnati.

**SAIL MAKERS.**

Baker, Howard H. & Co.....Buffalo.  
 Upson-Walton Co.....Cleveland.  
 Wilson & Silsby.....Boston.

**SALVAGE COMPANIES.**

See Wrecking Companies.

**SCHOOLS—NAVIGATION.**

Chicago Nautical School.....Chicago.

**SEARCH LIGHTS.**

General Electric Co.....Schenectady, N. Y.  
 Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

**SHEARS.**

See Punches, Rivets, and Shears.

**SHIP AND BOILER PLATES AND SHAPES.**

Bourne Fuller Co.....Cleveland, O.  
 Otis Steel Co.....Cleveland.

**SHIP BUILDERS.**

American Ship Building Co.....Cleveland.  
 Atlantic Works.....East Boston, Mass.  
 Bertram Engine Works Co., Ltd.....Toronto, Can.  
 Buffalo Dry Dock Co.....Buffalo.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Craig Ship Building Co.....Toledo, O.  
 Chicago Ship Building Co.....Chicago.  
 Detroit Ship Building Co.....Detroit.  
 Fore River Shipbuilding Co.....Quincy, Mass.  
 Great Lakes Engineering Works.....Detroit.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 Manitowoc Dry Dock Co.....Manitowoc, Wis.  
 Maryland Steel Co.....Sparrows Point, Md.  
 Milwaukee Dry Dock Co.....Milwaukee.  
 Newport News Ship Building Co.....Newport News, Va.  
 Roach's Ship Yard.....Chester, Pa.  
 Shipowner's Dry Dock Co.....Chicago.  
 Smith & Son, Abram.....Aigona, Mich.  
 Willard, Chas. P. & Co.....Chicago.

**SHIP CHANDLERS.**

Baker, Howard H. & Co.....Buffalo.  
 Marine Mfg. & Supply Co.....New York.  
 Upson-Walton Co.....Cleveland.

**SHIP DESIGNERS.**

Kidd, Joseph.....Duluth.  
 Kreer & Parsons.....Chicago.  
 Matteson & Drake.....Buffalo.  
 Rice & Lovejoy.....Buffalo.  
 Steel, Nacey & Hynd.....Cleveland.  
 Wood, W. J.....Chicago.

**SHIP LANTERNS AND LAMPS.**

Russell &amp; Watson.....Buffalo.

**SHIP TIMBER.**

Martin-Barriess Co.....Cleveland.

**SMOOTH-ON COMPOUND, FOR REPAIRS.**

Smooth-On Mfg. Co.....Jersey City, N. J.

**STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.**

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

**STEAM VESSELS FOR SALE.**

Gilchrist & Co., C. P.....Cleveland.  
 Holmes, Samuel.....New York.  
 Lester, S. S.....Quebec, Can.  
 McCarthy, T. R.....Montreal, Can.

**STEAMSHIP LINES, PASS. AND FREIGHT.**

American Line.....New York.  
 Anchor Line.....Buffalo.  
 Boston Steamship Co.....Boston.  
 Cleveland & Buffalo Transit Co.....Cleveland.  
 Detroit & Cleveland Line.....Cleveland.  
 Erie & Western Trans. Co.....Buffalo.  
 Goodrich Trans. Co.....Chicago.  
 International Mercantile Marine Co.....Philadelphia.  
 Manitou Steamship Co.....Chicago.  
 Mexican-American S. S. Co., New Orleans, La.  
 New York & Cuba Mail S. S. Co.....New York.  
 Niagara, St. Catharines & Toronto Ry. & Nav. Co.....St. Catharines, Ont.  
 Northern Michigan Trans. Co.....Chicago.  
 Red Star Line.....New York.  
 Richelieu & Ontario Nav. Co.....Montreal, Can.  
 United Fruit Co.....Boston.

**STEEL CASTINGS.**

Macbeth Iron Co.....Cleveland.  
 Otis Steel Co.....Cleveland.

**STEERING APPARATUS.**

American Ship Building Co.....Cleveland.  
 Chase Machine Co.....Cleveland.  
 Dake Engine Co.....Grand Haven, Mich.  
 Detroit Ship Building Co.....Detroit.  
 Hyde Windlass Co.....Bath, Me.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Marine Mfg. & Supply Co.....New York.  
 Moulton Steering Engine Co.....New York.  
 Pawling & Harnischfeger.....Milwaukee.  
 Sheriffs Mfg. Co.....Milwaukee.

**SUBMARINE DIVING APPARATUS.**  
 Morse & Son, A. J.....Boston.  
 Schrader's Son, A.....New York.

**SURVEYORS, MARINE.**

Gaskin, Edward.....Buffalo.  
 Hynd, Alexander.....Cleveland.  
 Lovejoy, H. O.....Buffalo.  
 Matteson & Drake.....Philadelphia.  
 Parker Bros. Co., Ltd.....Detroit.  
 Nacey, James.....Cleveland.  
 Rice, Henry.....Buffalo.  
 Steel, Adam.....Cleveland.  
 Wood, W. J.....Chicago.

**TESTS OF MATERIALS.**

Hunt, Robert W. & Co.....Chicago.  
 Pittsburg Testing Laboratory, Ltd.....Pittsburg.

**TILING, INTERLOCKING RUBBER.**

New York Belting &amp; Packing Co.....New York.

**TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.**

Allen, John F.....New York.  
 Watson-Stillman Co.....New York.

**TOOLS, WOOD WORKING.**

Atlantic Works, Inc.....Philadelphia.

**TOWING MACHINES.**

American Ship Windlass Co., Providence, R. I.  
 Chase Machine Co.....Cleveland.

**TOWING COMPANIES.**

Donnelly Salvage & Wrecking Co.....Kingston, Ont.  
 Great Lakes Towing Co.....Cleveland.  
 Midland Towing & Wrecking Co., Ltd.....Midland, Ont.

**TRAPS, STEAM.**

Kieley & Mueller.....New York.  
 Lunkenheimer Co.....Cincinnati.  
 Sturtevant Co., B. F.....Hyde Park, Mass.

**TRUCKS.**

Boston &amp; Lockport Block Co.....Boston.

**TUBING, SEAMLESS.**

Shelby Steel Tube Co.....Pittsburg, Pa.



## Buyers' Directory of the Marine Trade.—Continued.

## VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge & Valve Mfg. Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Crane Co. .... Chicago.  
 Jenkins Bros. .... New York.  
 Kieley & Mueller .... New York.  
 Lunkenheimer Co. .... Cincinnati.  
 Ross Valve Co. .... Troy, N. Y.

## VALVES FOR WATER AND GAS.

Ross Valve Co. .... Troy, N. Y.

## VARNISHES.

Detroit Varnish Co. .... Detroit.  
 Detroit White Lead Works. .... Detroit.  
 New Jersey Zinc Co. .... New York.  
 Also Ship Chandlers.

## VENTILATING APPARATUS FOR SHIPS.

Sturtevant, B. F. Co. .... Hyde Park, Mass.

## VESSEL AND FREIGHT AGENTS.

Boland, John J. .... Buffalo.  
 Brown & Co. .... Buffalo.  
 Elphicke, C. W. & Co. .... Chicago.  
 Fleming & Co., P. H. .... Chicago.  
 Gilchrist & Co., C. P. .... Cleveland.  
 Hall & Root .... Buffalo.  
 Helm & Co., D. T. .... Duluth.

## VESSEL AND FREIGHT AGENTS—Con.

Hawgood & Co., W. A. .... Cleveland.  
 Holmes, Samuel .... New York.  
 Hutchinson & Co. .... Cleveland.  
 Lester, S. S. .... Quebec, Can.  
 McCarthy, T. R. .... Montreal.  
 Mitchell & Co. .... Cleveland.  
 Parker Bros. Co., Ltd. .... Detroit.  
 Prindiville & Co. .... Chicago.  
 Richardson, W. C. .... Cleveland.  
 Sullivan, D. & Co. .... Chicago.

## WATER GAUGES.

Bonner & Co., Wm. T. .... Boston.  
 Lunkenheimer Co. .... Cincinnati, O.

## WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co. .... Buffalo.  
 DeGrauw, Aymar & Co. .... New York.  
 Upson-Walton Co. .... Cleveland.

## WHISTLES, STEAM.

American Steam Gauge & Valve Mfg. Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Lunkenheimer Co. .... Cincinnati.

## WINDLASSES.

American Ship Windlass Co. .... Providence, R. I.  
 American Ship Building Co. .... Cleveland.  
 Hyde Windlass Co. .... Bath, Me.  
 Jenks Ship Building Co. .... Port Huron, Mich.  
 Marine Mfg. & Supply Co. .... New York.

## WINCHES.

American Ship Windlass Co. .... Providence, R. I.  
 Georgian Bay Engineering Works. .... Midland, Ont.  
 Hyde Windlass Co. .... Bath, Me.

## WOOD WORKING MACHINERY.

Atlantic Works, Inc. .... Philadelphia.

## WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
 Great Lakes Towing Co. .... Cleveland.  
 Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.  
 Parker Bros. Co., Ltd. .... Detroit.

## YACHT AND BOAT BUILDERS.

Bertram Engine Works Co., Ltd. .... Toronto, Can.  
 Drein, Thos. & Son. .... Wilmington, Del.  
 Georgian Bay Engineering Works. .... Midland, Ont.  
 Truscott Boat Mfg. Co. .... St. Joseph, Mich.  
 Willard, Chas. P. & Co. .... Chicago.

## YAWLS.

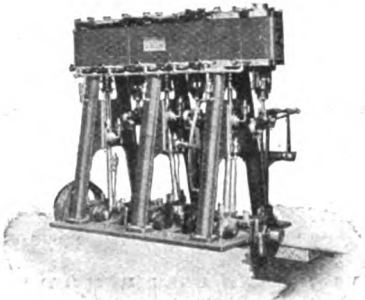
Drein, Thos. & Son. .... Wilmington, Del.

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 The dagger (†) indicates that advertisement appears once a month.

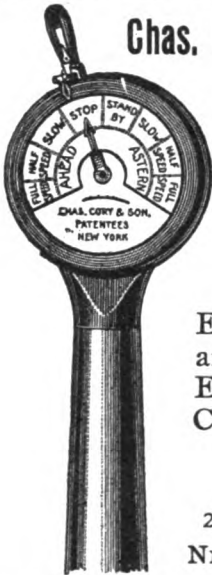
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Builders of Single, Compound, Triple-Expansion and Direct Connected Engines.

Boyer Sectional Water Tube boilers and machinery complete for light draft Passenger Boats, Yachts, Tugs, Etc.



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VERY USEFUL ON  
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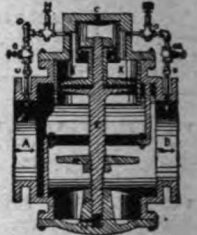
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These are the original, reliable, quick-opening valves, constructed on practical principles.

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Largest Manufacturers of  
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**SHIPS' CABLES, DREDGE CHAINS, CRANE CHAINS, BLOCK CHAINS.**  
Large chains furnished side or end welded. High grade tested chains a specialty.  
We manufacture our own iron. We are licensed testers for Lloyds Association, American Bureau of Shipping and Bureau Veritas.

## Hand Book of Admiralty Law

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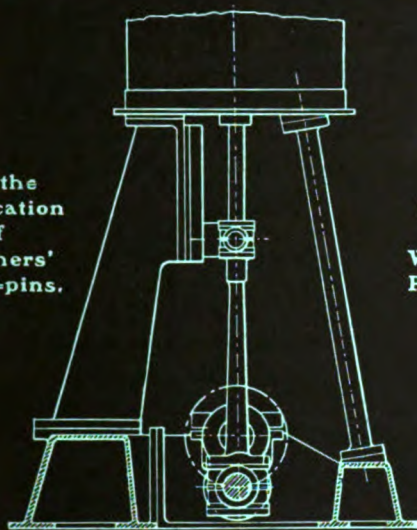
Cleveland, O.



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Lubrication  
of  
Steamers'  
Crank-pins.



Holds  
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World's  
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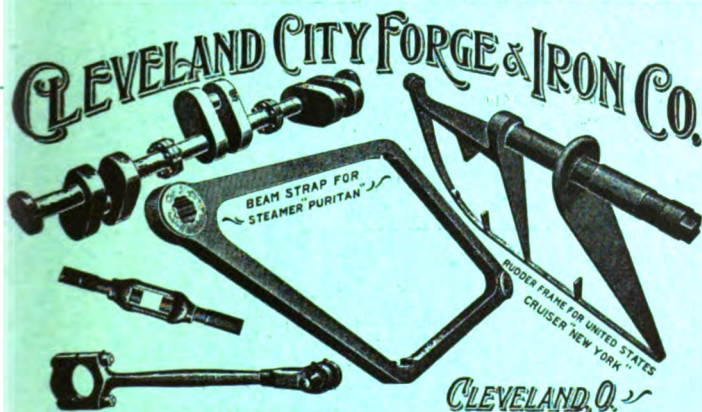
STANDARD OIL CO., of New York

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Gen. Mgr. D. L. WHITE, Vice President.  
J. W. BENSON, Secretary and Treasurer.

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FIRST-CLASS TUGS FOR WRECKING,  
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Six Sizes

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Chicago

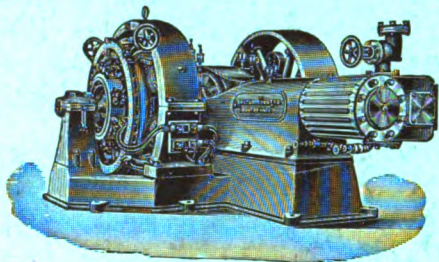
## LAKE SHORE AND MICHIGAN SOUTHERN RY.

Eastward	Arrive from West	Depart East
No. 18, Southwestern Limited .....	.....	*1:50 a.m.
No. 22, Lake Shore Limited. ....	*2:12 a.m.	*2:20 a.m.
No. 20, Chicago and Cleveland Exp. ....	*7:20 a.m.	.....
No. 28, New York and Boston Exp. ....	*7:40 a.m.	*8:00 a.m.
No. 40, Toledo and Buffalo Accom. ....	†10:00 a.m.	†10:30 a.m.
No. 32, Fast Mail .....	*11:25 a.m.	*11:30 a.m.
No. 48, Accommodation via Sandusky .....	†1:40 p.m.	.....
No. 42, Boston-New York Express .....	.....	*11:45 a.m.
No. 44, Cleveland and New York Spl. ....	.....	*3:00 p.m.
No. 46, Southwestern Express .....	.....	*3:10 p.m.
No. 116, Ashtabula Accommodation. ....	.....	†4:30 p.m.
No. 6, Limited Fast Mail .....	*5:40 p.m.	*5:45 p.m.
No. 26, 20th Century Limited. ....	*7:40 p.m.	*7:43 p.m.
No. 10, Chicago, N.Y. & Boston Spl. ....	*7:30 p.m.	*7:50 p.m.
No. 16, New England Express. ....	*10:30 p.m.	*10:35 p.m.
No. 2, Day Express .....	*9:10 p.m.	*9:25 p.m.
No. 126, Norwalk Accommodation. ....	†7:55 a.m.	.....
Westward	Arrive from East	Depart West
No. 7, Exposition Limited. ....	*12:50 a.m.	.....
No. 11, Southwestern Limited. ....	*2:55 a.m.	.....
No. 9, Day Express .....	.....	†6:10 a.m.
No. 15, Boston and Chicago Special. ....	*3:10 a.m.	*3:15 a.m.
No. 19, Lake Shore Limited .....	*7:15 a.m.	*7:25 a.m.
No. 23, Western Express .....	*10:30 a.m.	*10:35 a.m.
No. 29, Southwestern Special. ....	†11:10 a.m.	.....
No. 33, Southwestern Express .....	*12:25 p.m.	.....
No. 133, Cleveland and Detroit Exp. ....	.....	*12:45 p.m.
No. 47, Accommodation .....	†11:00 a.m.	†3:00 p.m.
No. 141, Sandusky Accommodation. ....	.....	†3:10 p.m.
No. 43, Fast Mail .....	*4:35 p.m.	*4:40 p.m.
No. 127, Norwalk Accommodation. ....	.....	†5:10 p.m.
No. 37, Pacific Express .....	*6:50 p.m.	*7:20 p.m.
No. 3, Fast Mail Limited. ....	*10:50 p.m.	*10:55 p.m.
No. 115, Ashtabula Accommodation. ....	*8:30 a.m.	.....

\*Daily. †Except Sunday. ‡Except Monday.  
Trains Nos. 23, 28 and 37 run via Erie Station.  
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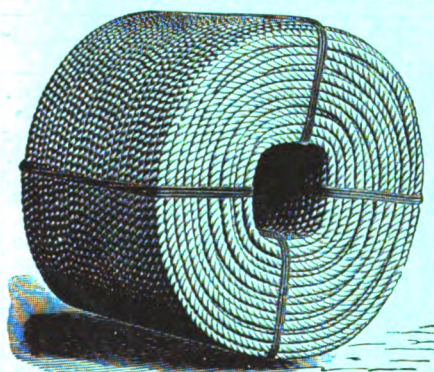
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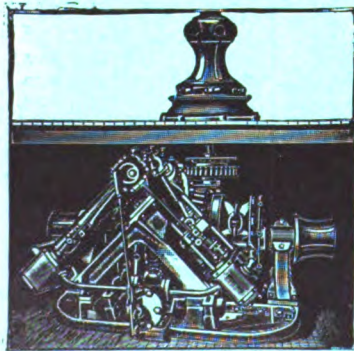
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(393)



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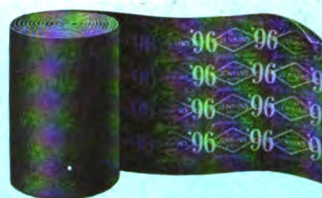
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